SERVICE MANUAL

marantz

model 4415

Quadradial 4 Receiver

marantz

TABLE OF CONTENTS

SECTION	PAGE
Introduction	1
Service Notes	1
AM Tuner	1
FM Tuner	2
Phono and Pre-Amplifier	3
Main Amplifier	4
Power Supply Unit	4
Audio Trouble Analysis	4
Test Equipment Required for Servicing	5
AM Alignment Procedure	5
FM Alignment Procedure	6
Audio Adjustment	7
Automatic Voltage Regulator Adjustment	7
Parts List	17
Technical Specifications	27

LIST OF ILLUSTRATIONS

FIGURE NO.		PAGE
1.	Dial Stringing	7
2.	Front Panel Adjustment and Component Locations	8
3.	Main Chassis Component Locations (Top View)	8
4.	Rear Panel Adjustment and Component Locations	9
5.	Main Chassis Component Locations (Bottom View)	9
6.	AM and FM Tuner Assembly P100 Component Locations	10
7.	Phono Amplifier Assembly P300 Component Locations	10
8.	Tone Amplifier Assembly P400 Component Locations	11
9.	Vari-Matrix Assembly P500 Component Locations	11
10.	Power Amplifier Assembly P600 Component Locations	12
11.	Loudness and Speaker Switch Assembly P700 Component Locations	12
12.	Tone Control Unit Assembly P750 Component Locations	13
13.	Power Supply Assembly P800 Component Locations	13
14.	Balance Control Unit Assembly P900 Component Locations	14
15.	Hi Filter Unit Assembly P950 Component Locations	14
16.	Schematic Diagram	15~16

INTRODUCTION

This service manual was prepared for use by Authorized Warranty Stations and contains service information for Marantz Model 4415 Quadradial 4 Receiver.

Servicing information and voltage data included in this manual are intended for use by the knowledgeable and experienced technician only. All instruction should be read carefully. No attempt should be made to proceed without a good understanding of the operation in the receiver.

The parts list furnish information by which replacement part may be ordered from the Marantz Company. A simple description is included for parts which can be usually be obtained through local suppliers.

1. SERVICE NOTES

As can be seen from the circuit diagram, the chassis of Model 4415 consists of following units. Each unit mounted on a printed circuit board is described within the square enclosed by a bold dotted line on the circuit diagram.

1. FM and AM Tuner ..... mounted on P.C. Board, P100
2. Phono Amplifier ..... mounted on P.C. Board, P300
3. Tone Amplifier ..... mounted on P.C. Board, P400
4. Vari-Matrix Unit ..... mounted on P.C. Board, P500
5. Power Amplifier ..... mounted on P.C. Board, P600
6. Loudness and Speaker Switch Unit ..... mounted on P.C. Board, P700
7. Tone Control Unit ..... mounted on P.C. Board, P750
8. Power Supply ..... mounted on P.C. Board, P800
9. Balance Control Unit ..... mounted on P.C. Board, P900
10. Hi Filter Unit ..... mounted on P.C. Board, P950
11. Indicator Lamps ..... mounted on P.C. Board, P980

2. AM TUNER

All components except ferrite bar antenna are mounted on a printed circuit board P100.

The AM signals induced in a ferrite bar antenna are applied to the base of converter transistor H113 through a capacitor of C171, while the local oscillator voltage is injected to the emitter of H113 through a capacitor C172. Both AM signals and oscillating voltage are mixed at the base-emitter junction and converted into 455KHz intermediate frequency. The resulting IF signal is applied to the first IF transformer L116 consisting of one ceramic filter and two tuned circuits.

The output of L116 is led to the transistor H104 which in turn apply its output to the transistor of next stage H105. The fully amplified IF output is then applied to the diode H123 to detect audible signal through the detector transformer L117. The detected audio signal is filtered and the final audio output is obtained from pin terminal J118 and applied to the audio amplifier section through the selector switch.

The DC component of the detected IF signal is used as a AGC voltage to control emitter current of H104 through the resistor R185. A part of IF signal output is also applied to the diode H124 through a capacitor C180 and rectified to obtain DC current for energizing the signal strength meter M009.

1.1 Suggestions for AM Tuner Trouble Shooting

Check for broken AM bar antenna, next try to tune station by rotating fly-wheel tuning knob slowly and observe the signal strength meter whether it deflects or not. If the signal strength meter gives a deflection at several frequencies received, no failure may exist in the stages at least preceding final IF transformer L117. Next connect a oscilloscope to the pin terminal J118 and check for audio signals with the tuning meter deflected. If the signal strength meter does not deflect, check the local oscillator circuit. Normal oscillating voltage at the hot end of the

oscillator tuning capacitor is about 2 or 3 volts, varying with tuning capacitor position. When measuring oscillating voltage use a RF VTVM, no circuit tester gives correct indication. If the local oscillator voltage is normal, check all voltage distribution in the AM circuits by using a DC VTVM and compare the measured values with those given in the schematic diagram.

3. FM TUNER

All components are mounted on a printed circuit board P100.

FM signals induced by a FM antenna are led to FM antenna coil L101.

These signals are then applied to the FET RF amplifier which in turn applies its output to the next transistor mixer H102 through a high Q tuned circuit.

The mixer convert its input signal into 10.7MHz intermediate frequency and amplifies it at the same time. The H103 is a local oscillator and its output is injected into the base of mixer transistor, the injection voltage is about 40mV.

The 10.7 MHz front end output is led to the next IF section. The IF section consists of five stage of IF amplifier and one stage of sub IF amplifier. Two pieces of ceramic filters are also used to obtain high selectivity, a pair of symmetrical diode limiters are also employed for the best limiting characteristics, improved capture ratio and good AM suppression. A part of IF amplifier H105 output is rectified by the diode H115, H116 and its DC output is fed back to the gate of FET RF amplifier to decrease the gain with increased signal strength.

3.1 Muting and Auto-Stereo Switching Circuits

The muting circuit consisting of all solid-state electrical switching has been incorporated in the Model 4415.

The DC voltage obtained by rectifying the sub IF output signal from the H109 is applied to the base of H110 and turns on it, if the sub IF output is greater than predetermined level (muting threshold level).

When H110 turns on, the muting switch transistor H111 is turned on, thus decreasing the emitter collector resistance to near zero ohm and allowing emitter current path to the final IF amplifier H108.

When the input signal is lower than the predetermined level, the DC output obtained is small and can not turn on the H110, thus the H110 keeps its turn off state and this makes the switch transistor keep H111 turn off, then no emitter current is supplied to the H108 and signals below the threshold level are muted out.

The muting threshold level can be varied by adjusting the trimming resistor R153.

The DC voltage obtained is also used to make the Auto-Stereo switching transistor H112 turn on and off, and used to energizing the signal strength meter M009.

3.2 MPX Stereo Decoding Circuit

A Non-equalized audio signal from the FM detector is applied through the phase adjuster network of C148 and R161 to input terminal pin ① on the MPX decoder IC H114. The MPX decoder IC consists of a stereo decoder and postamplifier for the output. The right and left channel signals decoded by the stereo decoder H114, appear at pin ⑩ (right channel) and pin ⑪ (left channel), respectively. These signals are passed through the low-pass filters and de-emphasis networks to eliminate undesirable residual switching signals and are then delivered to postamplifier input pin ⑤ (right channel) and pin ⑦ (left channel), respectively. The signals amplified in the postamplifiers to the required level (approximately 10dB) are delivered to pin ⑥ (right channel) and pin ⑧ (left channel), and are then passed through C169 and C168 to pin terminals J114 and J115, hence, through the selector switch to the audio amplifier section. Pin ⑮ on the MPX IC H114 is connected through R163 to the collector of the autostereo switch transistor H112, which turns on or off according to the incoming FM signal strength, thereby automatically switching between the stereophonic and monaural operations. The H112 turns on or off in accordance with whether the FM signal strength is more or less than approximately 25μV.

3.3 Suggestion for Trouble Shooting of FM Tuner

3.3.1 Symptom: No FM Reception

First turn on the power switch and try to tune FM stations. Rotate the fly-wheel tuning knob slowly and observe the FM signal strength meter. If the signal strength meter deflect at several frequencies received, the tuner circuits preceding the discriminator circuit may have no failure. When no reading is obtained in the meter, check FM local oscillator circuit, using a RF VTVM. The normal local oscillator voltage is one or two volts (rms) at the tuning capacitor, depending on the tuning capacitor position. If the local oscillator voltage is normal, next check all voltage distribution in the FM Front End and IF amplifier unit and compare them with those shown in the circuit diagram. When signal strength meter deflects but no sound is obtained, check audio circuits, using high sensitive oscilloscope.

3.3.2 Symptom: No Stereo Separation

Connect a FM RF signal generator output modulated by a stereo modulator to the rear FM ANTENNA terminals, and check the stereo beacon is turned on or not. If not turned on, check for 19 KHz pilot signal and 38 KHz switching signal, using an oscilloscope.

4. PHONO AND PRE-AMPLIFIER

Signals from the PHONO jacks are applied to the phono-amplifier mounted on P300. The amplified and RIAA equalized phono signals and signals from the tuner section and the TAPE/AUX jacks are applied to the selector switch which, in turn, leads the selected signals to the TAPE MON switch and TAPE OUT jacks. Applied to the other section of the TAPE MON switch are signals from the TAPE IN jacks. The TAPE MON switch selects the signals from the selector switch or those from the TAPE IN jacks and the selected signals go to the mode switch. Signals are then mode processed by the mode switch and its associated circuit and applied to the tone control amplifier through the volume control. The bass and treble controlled signals from the tone control amplifier pass through the balance control section and the hi filter before they reach the main amplifier.

4.1 Mode Switch

Mode switch S002 has positions of MONO, 2 CH, DISCRETE, VARI-MATRIX, and SQ DECODER.

In the MONO position, all input signals are mixed together and delivered to all four channels.

In the 2 CH position, each pair of input signals right-front (RF) and right-rear (RR), and left-front (LF) and left-rear (LR) are mixed together. The resultant signals (RF + RR) and (LF + LR) are delivered to the pairs of RF and RR, and LF and LR channels, respectively.

In the DISCRETE position, each channel signal is separately routed to the corresponding channel.

In the VARI-MATRIX position, 2-channel stereo input signals are converted into quadraphonic signals through the vari-matrix circuit; the input right and left channel signals are fed directly to the LF and RF channels, while the signals to the LR and RR channels are synthesized from the 2-channel input signals under the control of the dimension control. The LR and RR channel signal components are controlled by the dimension control as shown below.

Dimension Control Setting	LR Output	RR Output
Minimum (FCCW)	LF + RF	RF + LF
Center	LF	RF
Maximum (FCW)	LF - RF	RF -LF

When the dimension control is set to the minimum position the LR and RR channel signals become monophonic, to the center are stereophonic, and to the maximum are out of phase, thus

providing vanished sound image positioning.

In the SQ DECODER position, signal sources encoded by the CBS SQ system are ideally decoded into 4-channel signals. Required for this operation is incorporation of the SQ Adaptor, Model SQA-1, into the Model 4415.

4.2 Balance Control

Signals from the tone control amplifiers are fed into the balance control circuit, in which the signals are controlled by three balancers: FRONT L-R, REAR L-R, and FRONT-REAR. By setting the FRONT-REAR balancer to the "FRONT" side and the FRONT L-R balancer to the "L" side, for example, only the front left channel is drived.

The balance control circuit is provided with the remote control switch which makes the Model RC-4 Remote Control Box operative when set to the "REMOTE" position. In the "REMOTE" position the balancers on the Model 4415 become ineffective since signals are led to the Model RC-4. The volume level can be adjusted by the volume control either on the Model 4415 or Model RC-4. However, the maximum volume level available by adjustment of the Model RC-4 is determined by the volume control on the Model 4415.

Balance controlled signals are led through the hi filter to the main amplifier section for further power amplification.

5. MAIN AMPLIFIER

Transistor H601 is the pre-driver coupled to the transistor H603 through capacitor C609. The transistor H603 drives the inverter transistors H609 and H611 which, in turn, drive the power stage consisting of H001 and H002. Transistors H605 and H607 are current limiter operating as a power transistor protection circuit.

Excessive current flow in the power output stage is detected by the resistors R645 and R651 and the resultant variation is applied to the transistors H605 and H607 and make them turned on. This decreases the base biasing current for H609 and H611. In this way the current flow in the power output stage (H001 and H002) is restricted within a safe predetermined value.

6. POWER SUPPLY UNIT

The power supply unit consisting of transistors H801 and H802, which operates as an automatic voltage regulator provides +35V DC to all of the amplifiers except main amplifiers and +14V DC to the tuner section.

7. AUDIO TROUBLE ANALYSIS

1.	Excessive line consumption	a. Check for shorted rectifiers H013. b. Check for shorted transistors H001 through H008. Check L001 for short.
2.	No line consumption or zero bias.	a. Check line cord, fuse, shorted H009 through H012, H713 & H714. b. Check for open rectifiers H013, or open L001.
3.	Excessive hum and noise level	a. Check filter capacitors C005, C605, & C606. b. Check for shorted transistor H802.
4.	Parastic oscillation	a. Check for defective capacitors, C607, C608, C611, C612, C625 & C626.
5.	Improper clipping	a. Check for proper adjustment of R617 & R618.

8. TEST EQUIPMENT REQUIRED FOR SERVICING

Table 1 lists the test equipment required for servicing the Model 4415 Receiver.

Item	Manufacturer and Model No.	Use
AM Signal Generator		Signal source for AM alignment.
Test Loop		Used with AM Signal generator.
FM Signal Generator	Less than 0.3% distortion	Signal source for FM alignment.
Stereo Modulator	Less than 0.3% distortion	Stereo separation alignment and trouble shooting.
Audio Oscillator	Weston Model CVO-100P, less than 0.02% residual distortion is required.	Sinewave and squarewave signal source.
Oscilloscope	High sensitivity with DC horizontal and vertical amplifiers.	Waveform analysis and trouble shooting and ASO alignment.
VTVM	With AC, DC, RF range	Voltage measurements.
Circuit Tester		Trouble shooting.
AC Wattmeter	Simpson, Model 390	Monitors primary power to Amplifier.
AC Ammeter	Commercial Grade (1-10A)	Monitors amplifier output under short circuit condition.
Line Voltmeter	Commercial Grade (0-150VAC)	Monitors potential of primary power to amplifier.
Variable Autotransformer (0-140VAC, 10 amps)	Powerstat, Model 116B	Adjusts level of primary power to amplifier.
Shorting Plug	Use phono plug with 600 ohm across center pin and shell.	Shorts amplifier input to eliminate noise pickup.
Output Load (8 ohms, 0.5% 100W)	Commercial Grade	Provides 8-ohm load for amplifier output termination.
Output Load (4 ohms, 0.5% 100W)	Commercial Grade	Provides 4-ohm load for amplifier output termination.

Table 1 Test Equipment Required for Servicing

9. AM ALIGNMENT PROCEDURE

9.1 AM IF Alignment

1. Connect a sweep generator to the test point Ⓐ or J107 and an alignment scope to the test point Ⓑ.
2. Rotate each core of IF transformer L116 and L117 for maximum height and flat top symmetrical response.

9.2 AM Frequency Range and Tracking Alignment

1. Set AM signal generator to 525 KHz. Turn the tuning capacitor fully closed (place the tuning pointer at the low end.) and adjust the oscillator coil L115 for maximum audio output.

2. Set the signal generator to 1650 KHz. Place the tuning pointer in the high frequency end and adjust the oscillator trimmer on the oscillator tuning capacitor (CA-2) for maximum audio output.
3. Repeat the step 1 and 2 until no further adjustment is necessary.
4. Set the generator to 600 KHz and tune the receiver to the same frequency and adjust a slug core of AM ferrite rod antenna for maximum output.
5. Set the generator to 1400 KHz and tune the receiver to the same frequency and adjust the trimming capacitors of antenna (CA-1) for maximum output.
6. Repeat the step 4 and 5 until no further adjustment is necessary.

Note: During tracking alignment reduce the signal generator output as necessary to avoid AGC action.

10. FM ALIGNMENT PROCEDURE

1. Connect a FM signal generator to the FM ANTENNA terminals and a oscilloscope and an audio distortion analyzer to the TAPE OUT jacks on the rear panel.
2. Set the FM SG to 87.5 MHz and provide about 3 to 5μV. Place the tuning pointer at the low frequency end by rotating the tuning knob and adjust the core of oscillator coil L103 to obtain maximum audio output.
3. Set the FM SG to 108.5 MHz and provide about 3 to 5μV output. Rotate the tuning knob and place the tuning pointer at the high frequency end and adjust the trimming capacitor C187 for maximum output.
4. Repeat the step 2 and 3 until no further adjustment is necessary.
5. Set the FM SG to 90 MHz and tune the receiver to the same frequency. Decrease signal generator output until the audio output level decreases with the decreasing generator output. Adjust the antenna coil L101, RF coil L102 and IF transformer L105 for minimum audio distortion.
6. Set the FM SG to 106 MHz and tune the receiver to the same frequency. Adjust the trimming capacitor CF-1, CF-2 for minimum distortion.
7. Repeat the step 5 and 6 until no further adjustment is necessary.
8. Connect a DC VTVM with 1 volt range selected to the test point Ⓔ (J120) and adjust the secondary core (upper) of discriminator transformer L107 so that no voltage reading is obtained on the VTVM at no signal.
   Next set the FM SG to 98 MHz and increase the output level to 1 KμV, then tune the receiver to the same frequency so that no deflection is obtained on the VTVM.
   Adjust primary core (bottom) of L107 for minimum distortion, and adjust the L108 for the maximum deflection of FM signal strength meter M009.

10.1 Stereo Separation Alignment

1. Set the FM SG to provide 1 KμV at 98 MHz.
   Tune the receiver to the same frequency perfectely (so that the VTVM connected to the test point Ⓔ gives no reading).
2. Modulate the FM SG with stereo composite signal consisting of subchannel signal only (of course a pilot signal must be included).
   Adjust the core of L110 for maximum audio output, then, modulate the FM SG with a stereo composite signal consisting of L or R channel only, and adjust the trimming resistor R 161 for maximum and equal separation in both channels.

10.2 Muting Circuit Alignment

1. Set the FM SG output to provide 25μV (IHF) at 98 MHz and tune the receiver to the same frequency.
   Adjust the trimming resistor R153 for the threshold level of 25μV (during this adjustment turn the MUTING pushswitch "on").

11. AUDIO ADJUSTMENT

1. Connect a VTVM to J614 (+) and J620 (—) and adjust the trimming resistor R629 until the VTVM reads 10mV DC. For the other channel connect the VTVM to J615 (+) and J621 (—) and adjust the R630 for the same reading.
2. Connect a oscilloscope across the SPEAKER terminals. Apply an audio signal of 1 KHz to the AUX jacks and increase the audio signal until the audio output on the scope begin to start clipping. Adjust the trimming resistor R617 for equal and symmetrical clipping. For the other channel adjust the R618.

12. AUTOMATIC VOLTAGE REGULATOR ADJUSTMENT

Connect a VTVM to J801 (+) and J808 (—) and adjust R801 until the VTVM reads 35.0V under no signal condition.

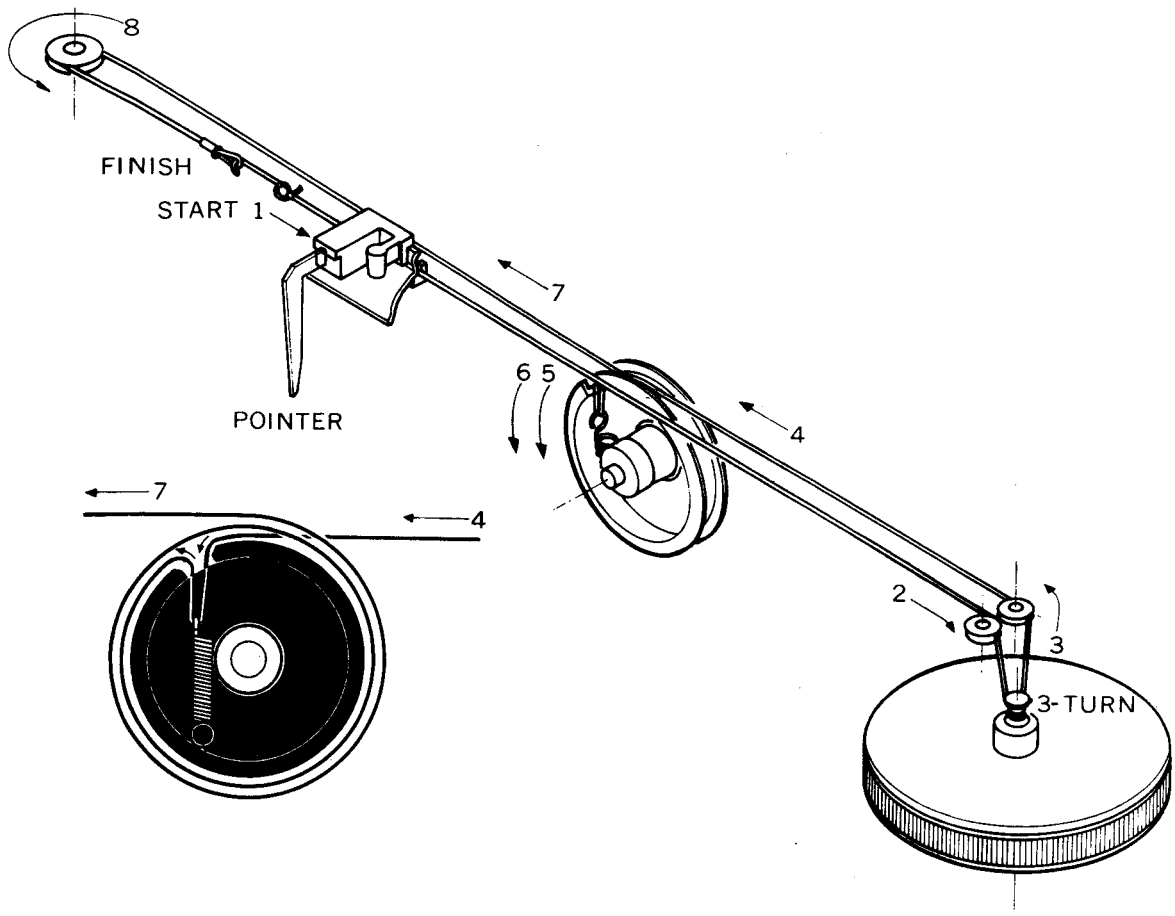

Figure 1. Dial Stringing

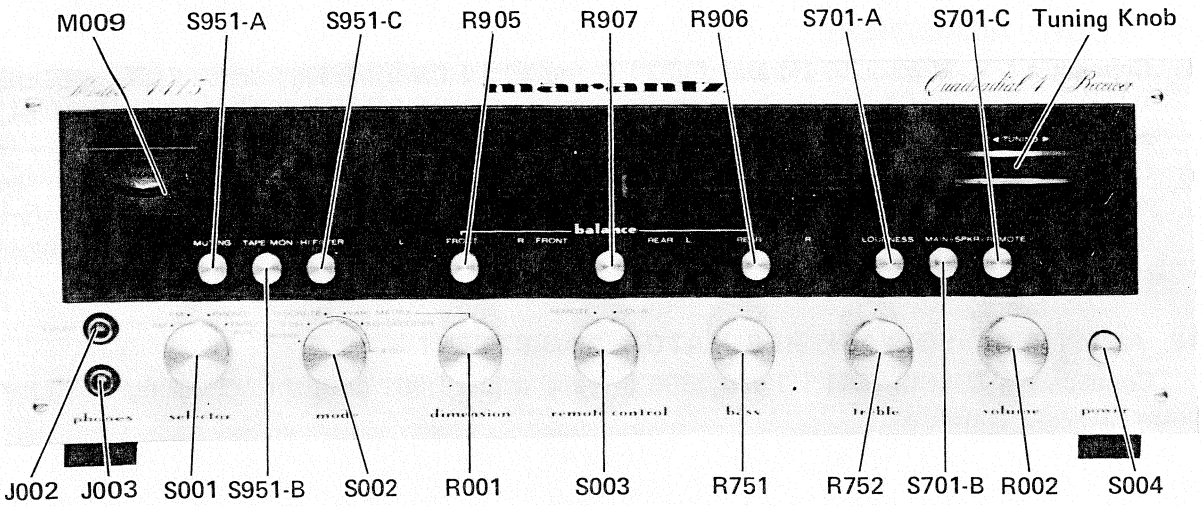

Figure 2. Front Panel Adjustment and Component Locations

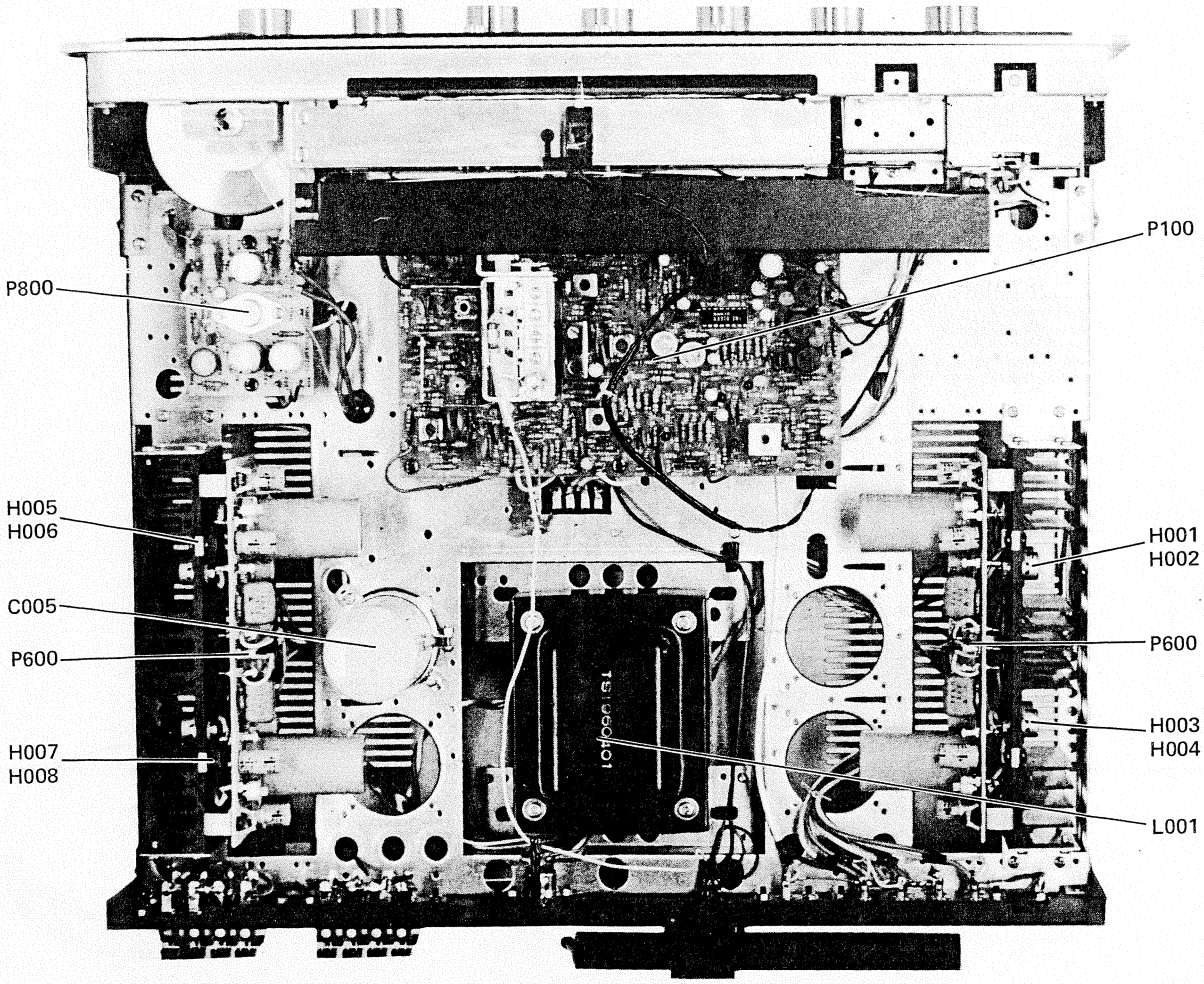

Figure 3. Main Chassis Component Locations (Top View)

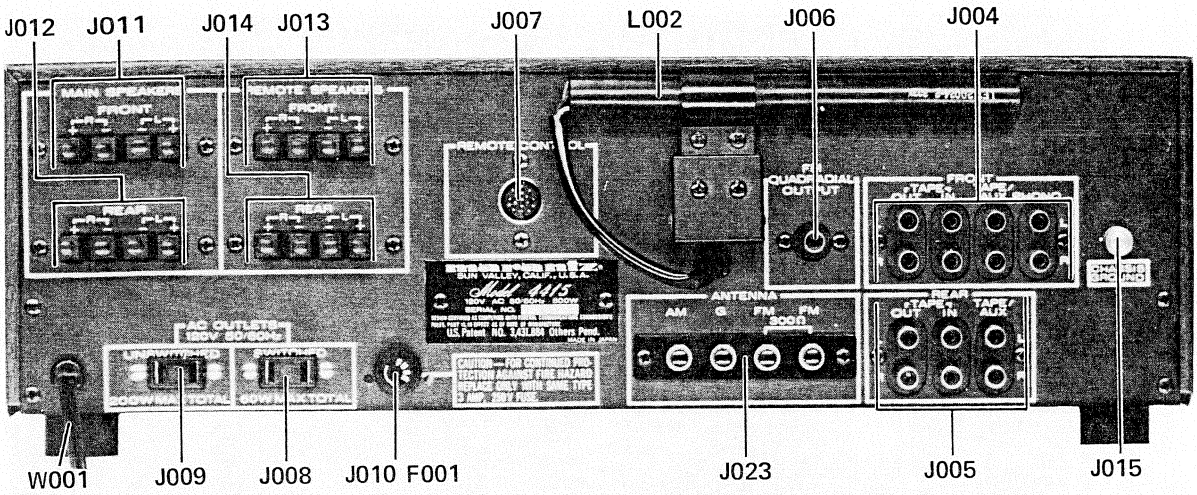

Figure 4. Rear Panel Adjustment and Component Locations

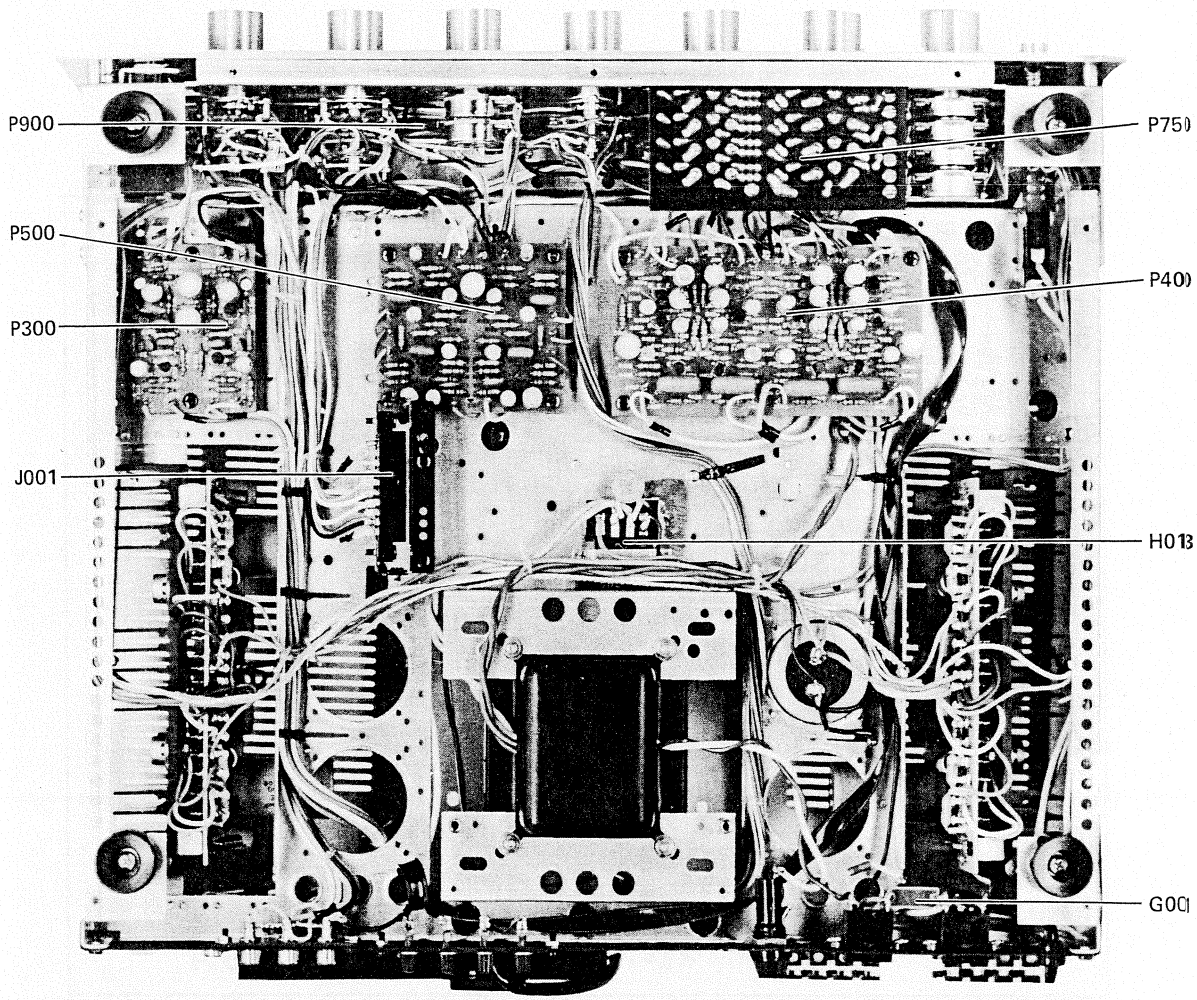

Figure 5. Main Chassis Component Locations (Bottom View)

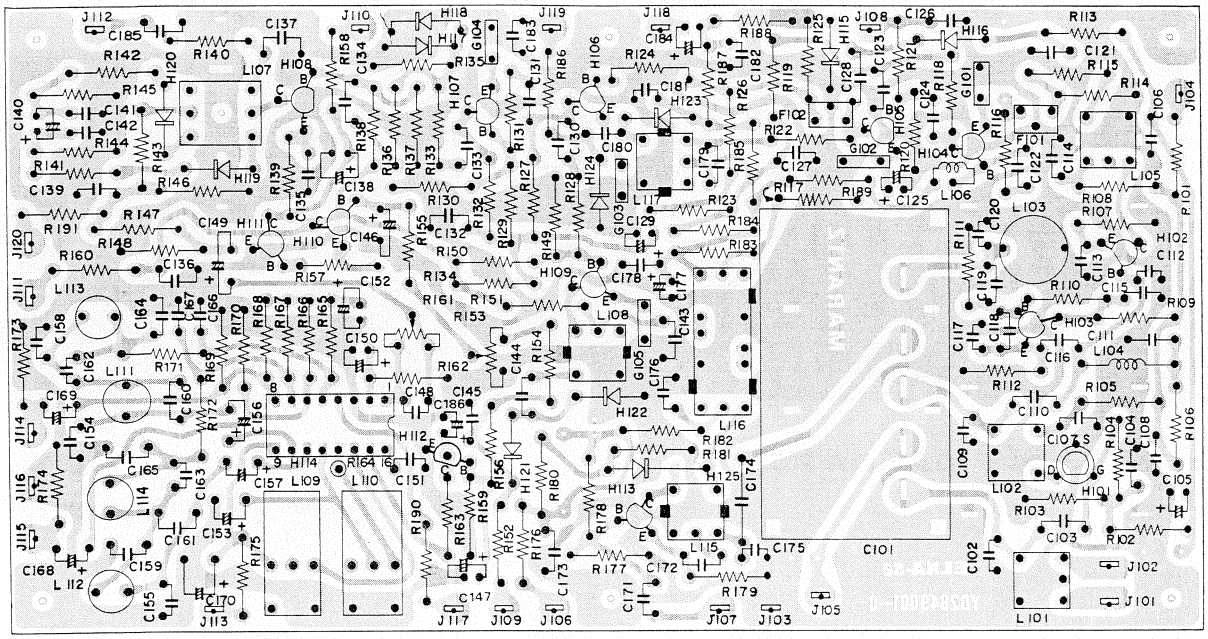

Figure 6. AM and FM Tuner Assembly P100 Component Locations

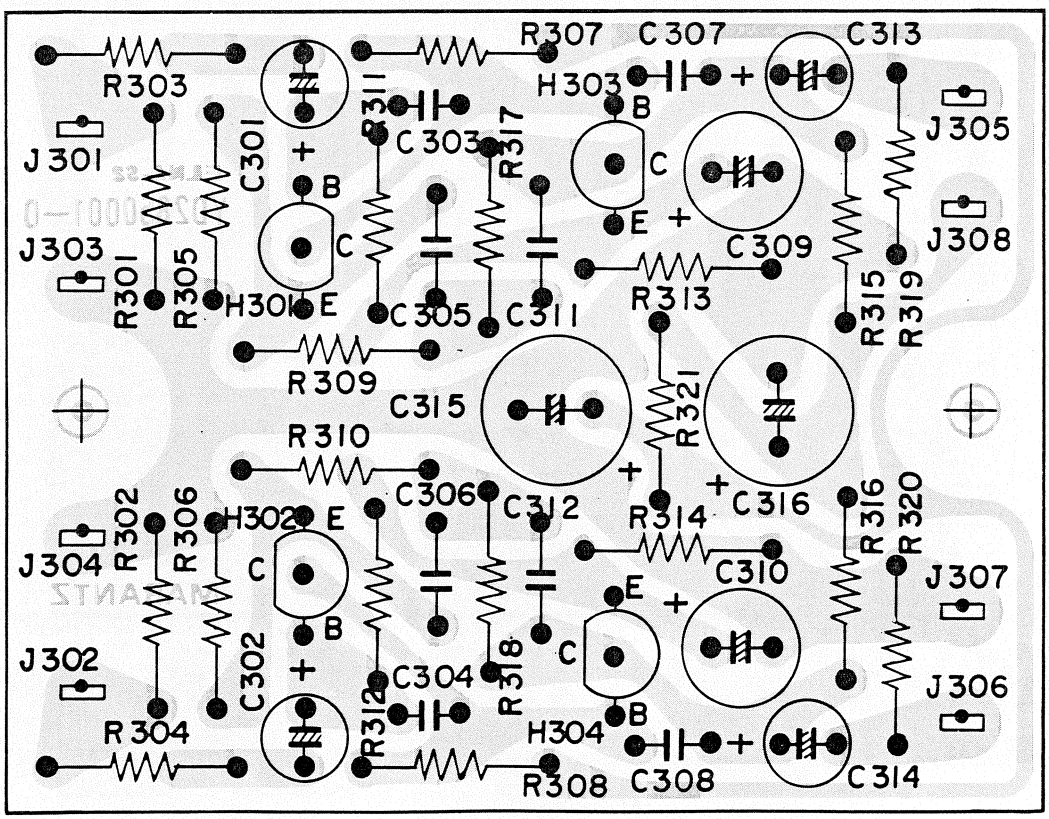

Figure 7. Phono Amplifier Assembly P300 Component Locations

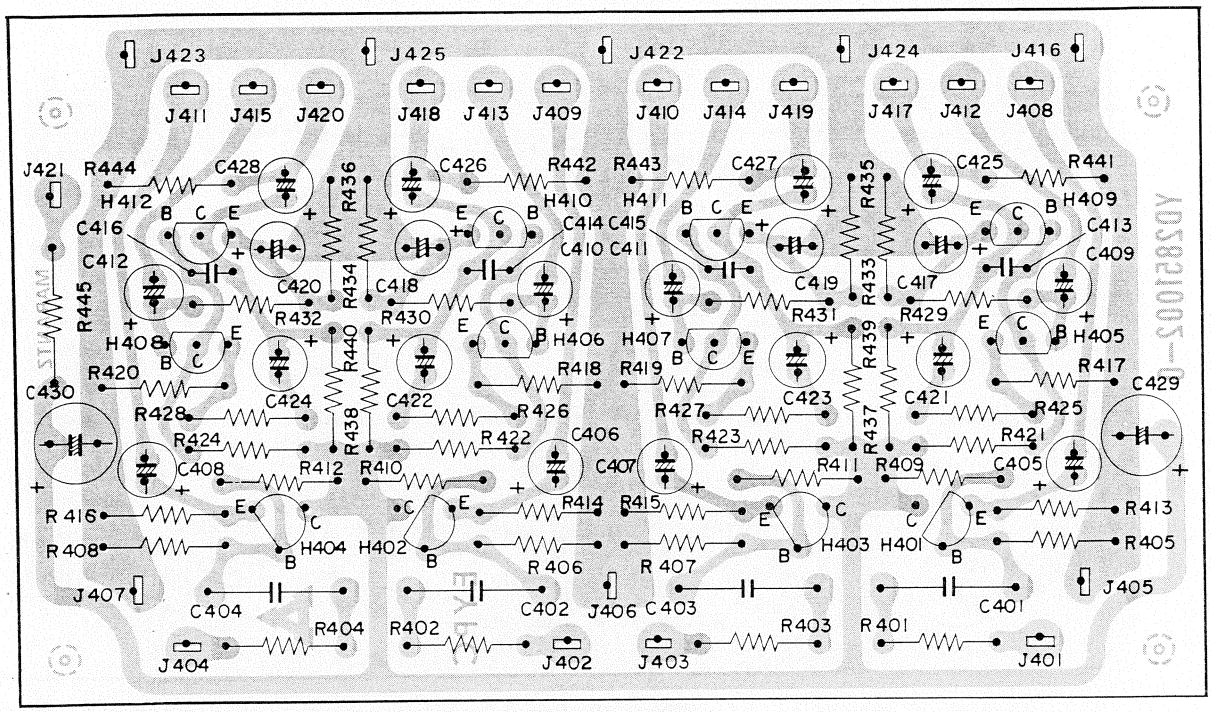

Figure 8. Tone Amplifier Assembly P400 Component Locations

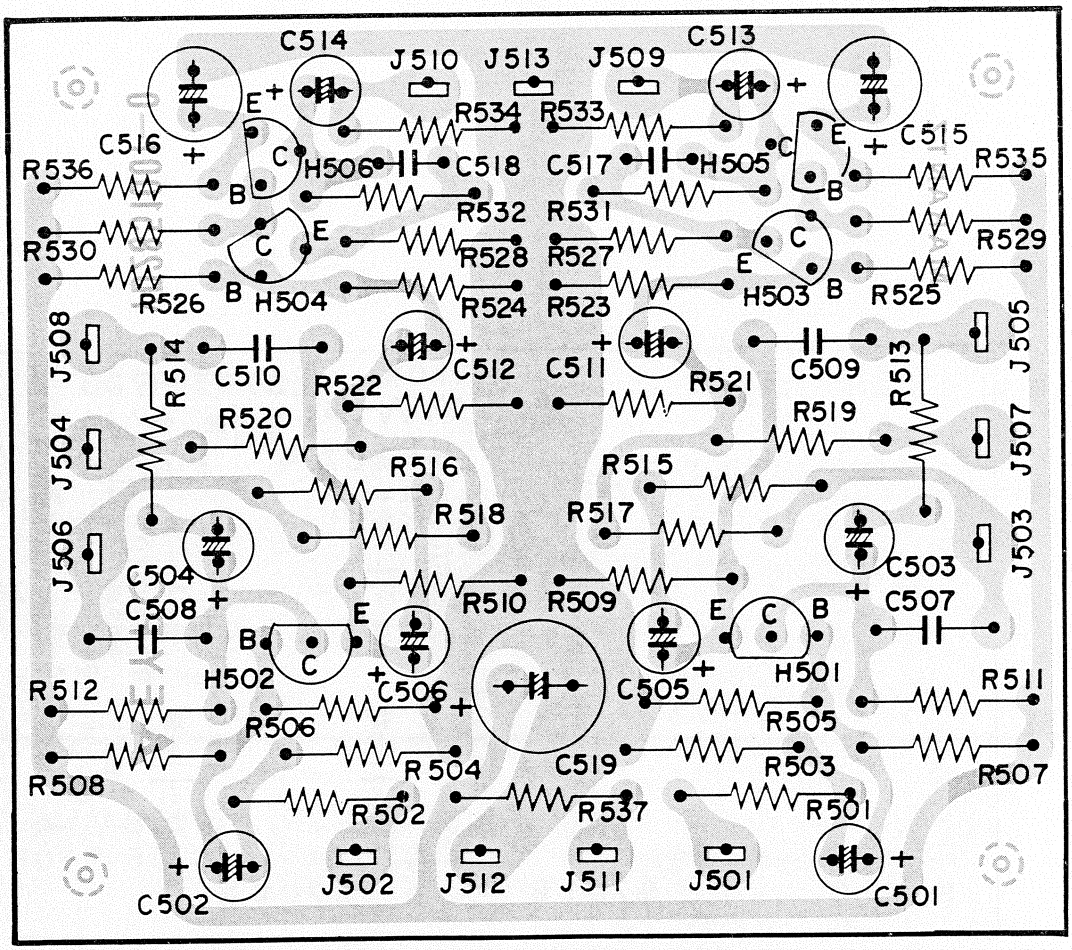

Figure 9. Vari-Matrix Assembly P500 Component Locations

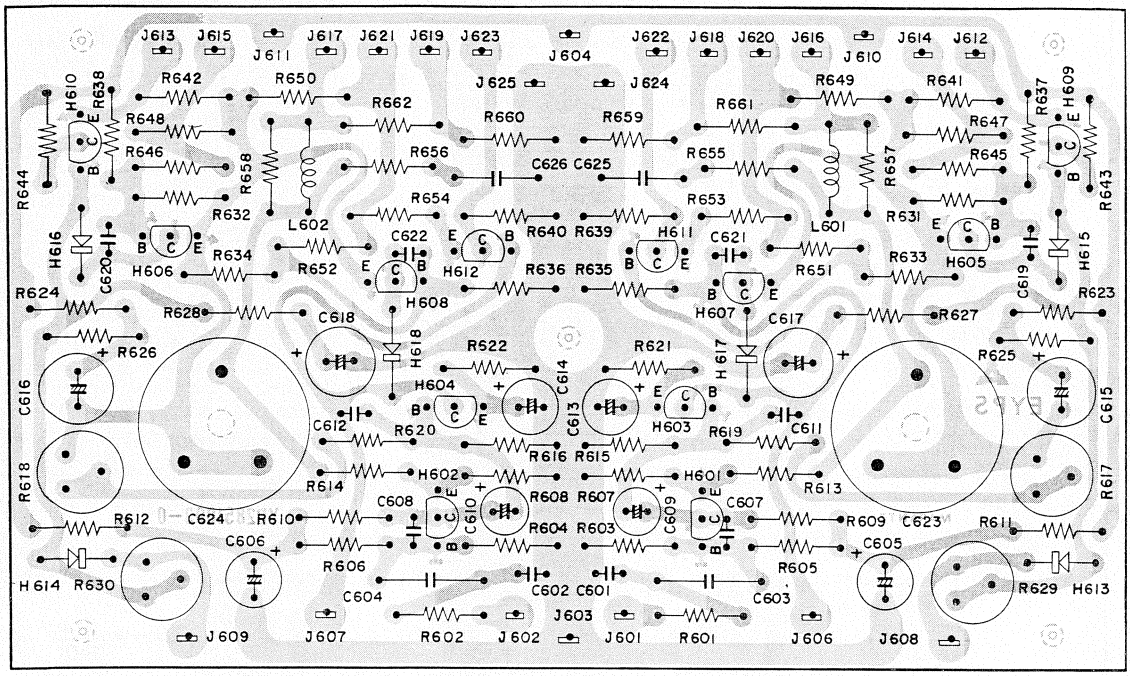

Figure 10. Power Amplifier Assembly P600 Component Locations

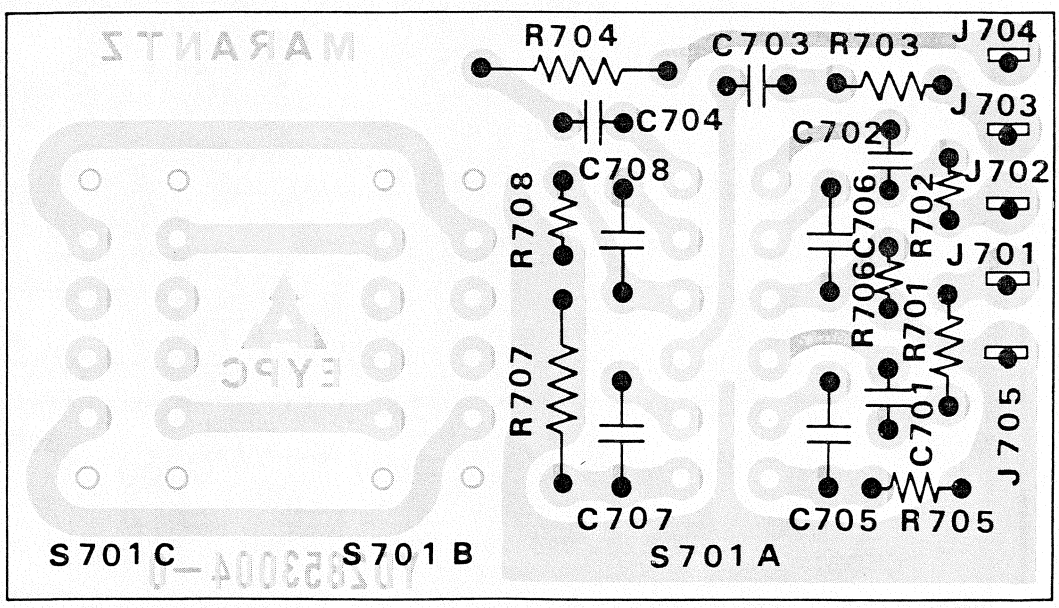

Figure 11. Loudness and Speaker Switch Assembly P700 Component Locations

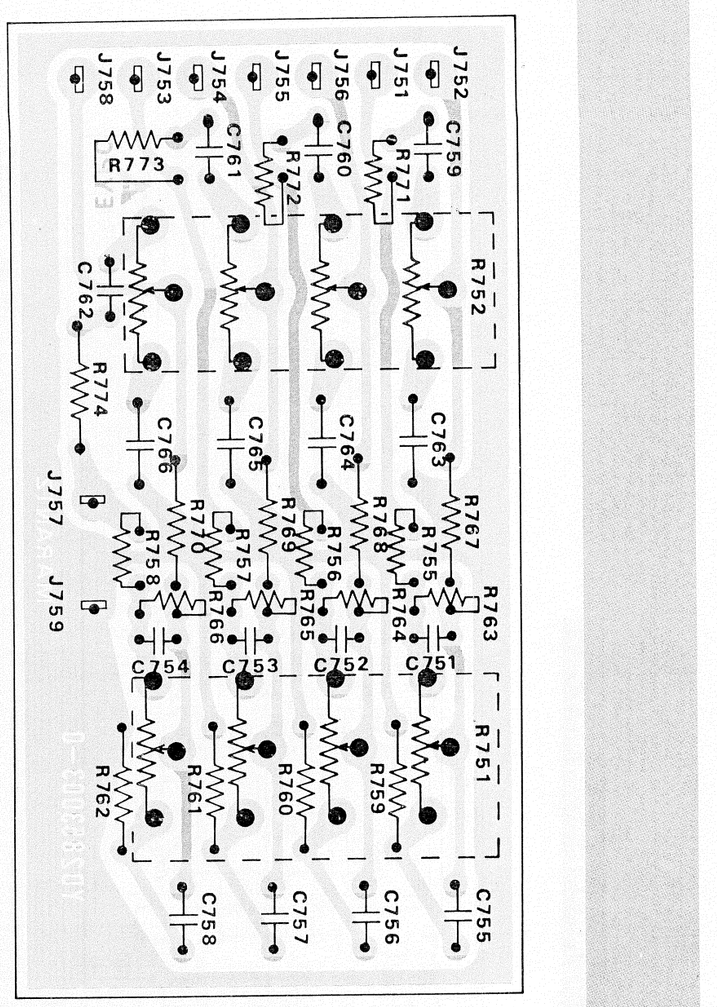

Figure 12. Tone Control Unit Assembly P750 Component Locations

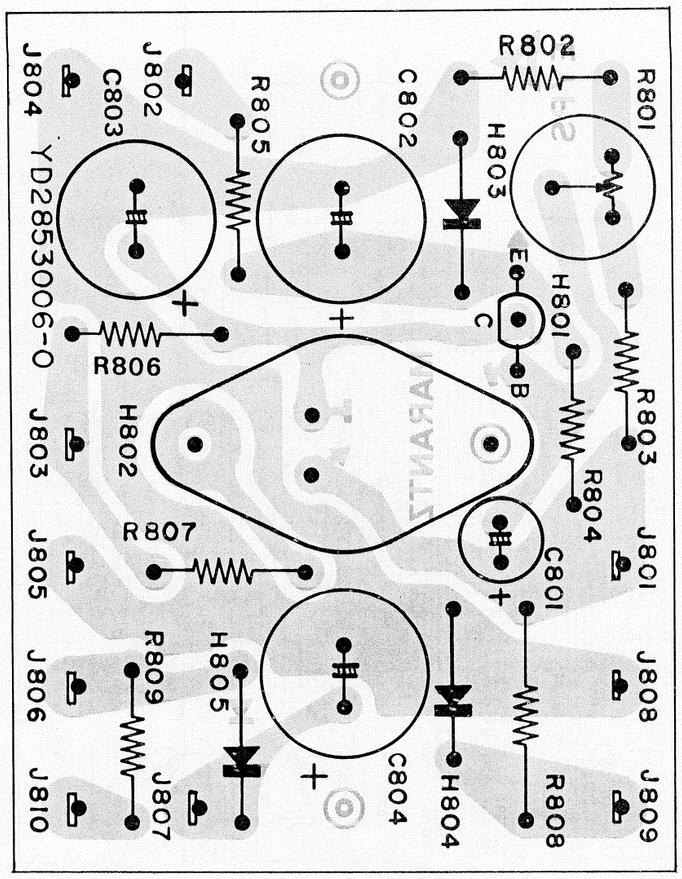

Figure 13. Power Supply Assembly P800 Component Locations

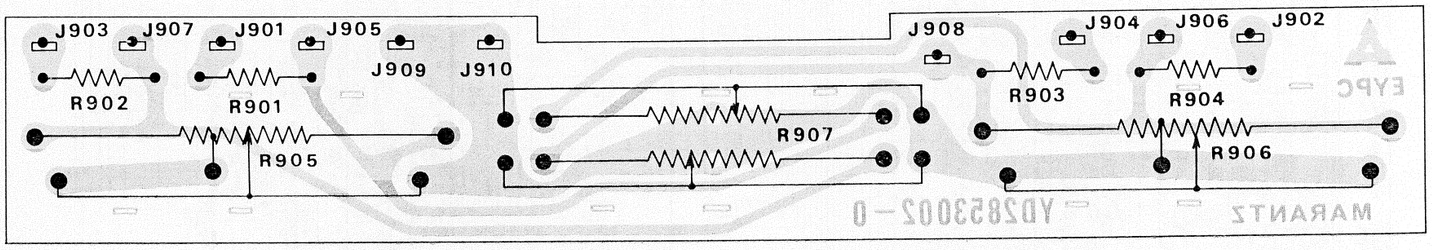

Figure 14. Balance Control Unit Assembly P900 Component Locations

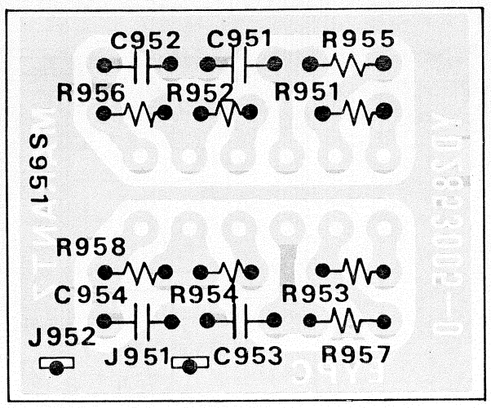

Figure 15. Hi Filter Unit Assembly P950 Component Locations

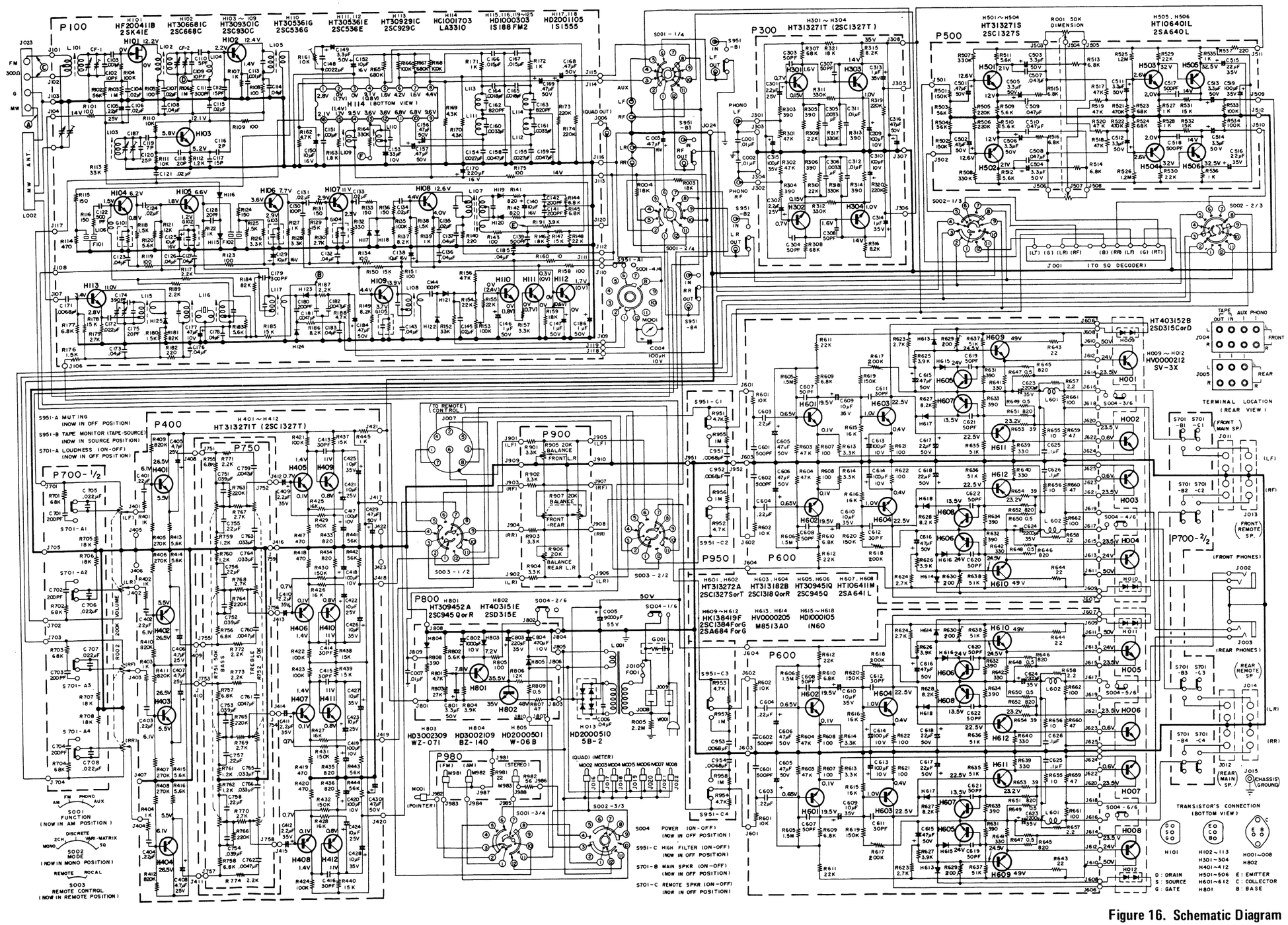

Figure 16. Schematic Diagram

PARTS LIST

REF. DESIG.	MARANTZ PART NO.	DESCRIPTION
P100	YD2849001	P.C. Board
	ZZ2853101	P.C. Board Ass'y
		RESISTORS (All resistors are ±5% and ¼W, unless otherwise indicated.)
R101	RT0510114	100Ω
R102	RT0556314	56KΩ
R103	RT0510514	1MΩ
R104	RT0510414	100KΩ
R105	RT0510114	100Ω
R106	RT0510514	1MΩ
R107	RT0510214	1KΩ
R108	RT0510114	100Ω
R109	RT0510114	100Ω
R110	RT0510314	10KΩ
R111	RT0510314	10KΩ
R112	RT0512214	1.2KΩ
R113	RT0533314	33KΩ
R114	RT0547114	470Ω
R115	RT0515114	150Ω
R116	RT0515114	150Ω
R117	RT0522214	2.2KΩ
R118	RT0515214	1.5KΩ
R119	RT0510114	100Ω
R120	RT0556214	5.6KΩ
R121	RT0512314	12KΩ
R122	RT0510214	1KΩ
R123	RT0510114	100Ω
R124	RT0515114	150Ω
R125	RT0515214	1.5KΩ
R126	RT0533214	3.3KΩ
R127	RT0510214	1KΩ
R128	RT0533214	3.3KΩ
R129	RT0515314	15KΩ
R130	RT0527214	2.7KΩ
R131	RT0515114	150Ω
R132	RT0533114	330Ω
R133	RT0515114	150Ω
R134	RT0510114	100Ω
R135	RT0510414	100KΩ
R136	RT0515114	150Ω
R137	RT0582214	8.2KΩ
R138	RT0515314	15KΩ
R139	RT0510214	1KΩ
R140	RT0522114	220Ω
R141	RT0582114	820Ω
R142	RT0582114	820Ω
R143	RT0510114	100Ω
R144	RT0568214	6.8KΩ
R145	RT0568214	6.8KΩ
R146	RT0518314	18KΩ
R147	RT0515314	15KΩ
R148	RT0522314	22KΩ
R149	RT0582214	8.2KΩ
R150	RT0515314	15KΩ
R151	RT0510114	100Ω
R152	RT0533314	33KΩ
R153	RA0104015	Trimming 100K (B)
R154	RT0522314	Trimming 22KΩ
R155	RT0522314	Trimming 22KΩ

REF. DESIG.	MARANTZ PART NO.	DESCRIPTION
R156	RT0547314	47KΩ
R157	RT0533214	3.3KΩ
R158	RT0510114	100Ω
R159	RT0518314	18KΩ
R160	RT0510014	10Ω
R161	RA0103020	Trimming 10K (B)
R162	RT0547214	4.7KΩ
R163	RT0518214	1.8KΩ
R164	RC1033412	330KΩ
R165	RT0568414	680KΩ
R166	RT0510414	100KΩ
R167	RT0568414	680KΩ
R168	RT0510414	100KΩ
R169	RT0543214	4.3KΩ
R170	RT0543214	4.3KΩ
R171	RT0510214	1KΩ
R172	RT0510214	1KΩ
R173	RT0522414	220KΩ
R174	RT0522414	220KΩ
R175	RT0510114	100Ω
R176	RT0515214	1.5KΩ
R177	RT0568214	6.8KΩ
R178	RT0515314	15KΩ
R179	RT0527214	2.7KΩ
R180	RT0515214	1.5KΩ
R181	RT0582314	82KΩ
R182	RT0522114	220Ω
R183	RT0556214	5.6KΩ
R184	RT0582314	82KΩ
R185	RT0515314	15KΩ
R186	RT0582214	8.2KΩ
R187	RT0522214	2.2KΩ
R188	RT0547214	4.7KΩ
R189	RT0522214	2.2KΩ
R191	RT0539214	3.9KΩ
		CAPACITORS
C101	CA3240007	Variable FM-3, AM-2 Gang
C102	DD1210001	Ceramic 10pF ±10%
C103	DK1710201	Ceramic 0.001μF ±20%
C104	DK1820302	Ceramic 0.02μF $^{+100}_{-0}$%
C105	EM2240251	Electroly 0.22μF 25V
C106	DK1820302	Ceramic 0.02μF $^{+100}_{-0}$%
C107	DK1820302	Ceramic 0.02μF $^{+100}_{-0}$%
C108	DK1840302	Ceramic 0.04μF $^{+80}_{-20}$%
C109	DD1210001	Ceramic 10pF ±10%
C110	DD1105001	Ceramic 5pF ±0.5pF
C111	DD1530101	Ceramic 300pF ±5%
C112	DD1615003	Ceramic 15pF ±10%
C113	DK1710201	Ceramic 0.001μF ±20%
C114	DK1840302	Ceramic 0.04μF $^{+80}_{-20}$%
C115	DK1820302	Ceramic 0.02μF $^{+100}_{-0}$%
C116	DD1102004	Ceramic 2pF ±0.05pF
C117	DD1615003	Ceramic 15pF ±10%
C118	DD1520001	Ceramic 20pF ±5%
C119	DD1207003	Ceramic 7pF ±1pF
C120	DD1525002	Ceramic 25pF ±5%

REF. DESIG.	MARANTZ PART NO.	DESCRIPTION
C121	DK1820302	Ceramic 0.02μF $^{+100}_{-0}$%
C122	DD1650101	Ceramic 500pF ±10%
C123	DK1840302	Ceramic 0.04μF $^{+80}_{-20}$%
C124	DK1820302	Ceramic 0.02μF $^{+100}_{-0}$%
C125	EA1060169	Electroly 10μF 16V
C126	DK1840302	Ceramic 0.04μF $^{+80}_{-20}$%
C127	DK1840302	Ceramic 0.04μF $^{+80}_{-20}$%
C128	DD1620001	Ceramic 20pF ±10%
C129	EA1060169	Electroly 10μF 16V
C130	DD1610101	Ceramic 100pF ±10%
C131	DK1820302	Ceramic 0.02μF $^{+100}_{-0}$%
C132	DK1840302	Ceramic 0.04μF $^{+80}_{-20}$%
C133	DK1820302	Ceramic 0.02μF $^{+100}_{-0}$%
C134	DK1820302	Ceramic 0.02μF $^{+100}_{-0}$%
C135	DK1820302	Ceramic 0.02μF $^{+100}_{-0}$%
C136	DK1840302	Ceramic 0.04μF $^{+80}_{-20}$%
C137	DK1840302	Ceramic 0.04μF $^{+80}_{-20}$%
C138	EA1060169	Electroly 10μF 16V
C139	DD1650101	Ceramic 500pF ±10%
C140	EA1060169	Electroly 10μF 16V
C141	DD1620101	Ceramic 200pF ±10%
C142	DD1620101	Ceramic 200pF ±10%
C143	DK1840302	Ceramic 0.04μF $^{+80}_{-20}$%
C144	DD1610101	Ceramic 100pF ±10%
C145	DK1820302	Ceramic 0.02μF $^{+100}_{-0}$%
C146	EA1050509	Electroly 1μF 50V
C147	EA1050509	Electroly 1μF 50V
C148	DF1722201	Film 0.0022μF ±20%
C149	EA3350509	Electroly 3.3μF 50V
C150	EA1060169	Electroly 10μF 16V
C151	DF1610201	Film 0.001μF ±10%
C152	EA1060169	Electroly 10μF 16V
C153	EA3360109	Electroly 33μF 10V
C154	DF1627201	Film 0.0027μF ±10%
C155	DF1627201	Film 0.0027μF ±10%
C156	EA4740501	Electroly 0.47μF 50V
C157	EA4740501	Electroly 0.47μF 50V
C158	DF1647201	Film 0.0047μF ±10%
C159	DF1647201	Film 0.0047μF ±10%
C160	DF1533205	Film 0.0033μF ±5%
C161	DF1533205	Film 0.0033μF ±5%
C162	DF5582101	Film 820pF ±5%
C163	DF5582101	Film 820pF ±5%
C164	DF1618205	Film 0.0018μF ±10%
C165	DF1618205	Film 0.0018μF ±10%
C166	DF1615301	Film 0.015μF ±10%
C167	DF1615301	Film 0.015μF ±10%
C168	EA4740501	Electroly 0.47μF 50V
C169	EA4740501	Electroly 0.47μF 50V
C170	EA2270169	Electroly 220μF 16V

REF. DESIG.	MARANTZ PART NO.	DESCRIPTION
C171	DF1768201	Film 0.0068μF ±20%
C172	DF1782301	Film 0.022μF ±20%
C173	DF1740301	Film 0.04μF ±20%
C174	DF6539101	Film 390pF ±5%
C175	DD1620001	Ceramic 20pF ±10%
C176	DF1740301	Film 0.04μF ±20%
C177	EA4760109	Electroly 47μF 10V
C178	DK1840302	Ceramic 0.04μF $^{+80}_{-20}$%
C179	DD1530101	Ceramic 300pF ±5%
C180	DD1620101	Ceramic 200pF ±10%
C181	DF1647201	Film 0.0047μF ±10%
C182	DF1647201	Film 0.0047μF ±10%
C183	DK1840302	Ceramic 0.04μF $^{+80}_{-20}$%
C184	EA4740501	Electroly 0.47μF 50V
C185	DK1840302	Ceramic 0.04μF $^{+80}_{-20}$%
C186	EA1050509	Electroly 1μF 50V
C187	CT1100008	Trimming 10pF
		MISCELLANEOUS
G101	BF4030001	Printed Compo. 0.04μF + 270Ω
G102	BF2230008	Printed Compo. 0.022μF + 270Ω
G103	BF2230007	Printed Compo. 0.022μF + 680Ω
G104	BF2230006	Printed Compo. 0.022μF + 1KΩ
G105	BF2230006	Printed Compo. 0.022μF + 1KΩ
F101	FF1107004	Ceramic Filter CFS107M
F102	FF1107004	Ceramic Filter CFS107M
		COILS and TRANSFORMERS
L101	LA1004606	Ant Coil FM
L102	LA1027809	RF Coil FM
L103	LO1203601	OSC Coil FM
L104	LC1751001	Choke Coil 0.75μH
L105	LI1001601	IFT FM
L106	LC1223002	Choke Coil 22μH
L107	LI1401623	IFT FM
L108	LI1015602	IFT FM
L109	LS1031001	MPX Coil 19KHz
L110	LS1031004	MPX Coil 38KHz
L111	LC2226004	Choke Coil 22mH
L112	LC2226004	Choke Coil 22mH
L113	LC2226004	Choke Coil 22mH
L114	LC2226004	Choke Coil 22mH
L115	LO1001042	OSC Coil AM
L116	LI1028002	IFT AM
L117	LI1001048	IFT AM
		SEMICONDUCTORS
H101	HF200411B	FET 2SK41E
H102	HT306681C	Transistor 2SC668C
H103	HT309301C	Transistor 2SC930C
H104	HT309301C	Transistor 2SC930C
H105	HT309301C	Transistor 2SC930C
H106	HT309301C	Transistor 2SC930C
H107	HT309301C	Transistor 2SC930C
H108	HT309301C	Transistor 2SC930C
H109	HT309301C	Transistor 2SC930C
H110	HT305361G	Transistor 2SC536G
H111	HT305361E	Transistor 2SC536E
H112	HT305361E	Transistor 2SC536E

REF. DESIG.	MARANTZ PART NO.	DESCRIPTION	
H113	HT309291C	Transistor	2SC929C
H114	HC1001703	IC	LA3310
H115	HD1000303	Diode	1S188FM2
H116	HD1000303	Diode	1S188FM2
H117	HD2001105	Diode	1S1555
H118	HD2001105	Diode	1S1555
H119	HD1000303	Diode	1S188FM2
H120	HD1000303	Diode	1S188FM2
H121	HD1000303	Diode	1S188FM2
H122	HD1000303	Diode	1S188FM2
H123	HD1000303	Diode	1S188FM2
H124	HD1000303	Diode	1S188FM2
H125	HD1000303	Diode	1S188FM2
		MISCELLANEOUS	
J101	YP1000099	Plug	
J102	YP1000099	Plug	
J103	YP1000099	Plug	
J104	YP1000099	Plug	
J106	YP1000099	Plug	
J107	YP1000099	Plug	
J108	YP1000099	Plug	
J109	YP1000099	Plug	
J110	YP1000099	Plug	
J111	YP1000099	Plug	
J112	YP1000099	Plug	
J113	YP1000099	Plug	
J114	YP1000099	Plug	
J115	YP1000099	Plug	
J116	YP1000099	Plug	
J117	YP1000099	Plug	
J118	YP1000099	Plug	
J119	YP1000099	Plug	
J120	YP1000099	Plug	
1008	282110901	Shield X 2	
1010	286710901	Shield	
1012	28501902	Shield	
1014	282100501	Clamper	
P300	YD2850001	P.C. Board	Phono EQ
	ZZ2850001	P.C. Board Ass'y	
		RESISTORS	
R301	RT0547314	**(All resistors are**	47KΩ
R302	RT0547314	**±5% and ¼W.)**	47KΩ
R303	RT0539114		390Ω
R304	RT0539114		390Ω
R305	RT0539114		390Ω
R306	RT0539114		390Ω
R307	RT0568314		68KΩ
R308	RT0568314		68KΩ
R309	RT0522314		22KΩ
R310	RT0522314		22KΩ
R311	RT0533414		330KΩ
R312	RT0533414		330KΩ
R313	RT0539114		390Ω
R314	RT0539114		390Ω
R315	RT0582214		8.2KΩ

REF. DESIG.	MARANTZ PART NO.	DESCRIPTION			
R316	RT0582214		8.2KΩ		
R317	RT0533414		330KΩ		
R318	RT0533414		330KΩ		
R319	RT0522414		220KΩ		
R320	RT0522414		220KΩ		
R321	RT0518314		18KΩ		
		CAPACITORS			
C301	EM2250251	Electroly	2.2μF	±20%	25V
C302	EM2250251	Electroly	2.2μF	±20%	25V
C303	DD1650001	Ceramic	50pF	±10%	50V
C304	DD1650001	Ceramic	50pF	±10%	50V
C305	DF1633205	Film	0.0033μF	±10%	50V
C306	DF1633205	Film	0.0033μF	±10%	50V
C307	DD1650001	Ceramic	50pF	±10%	50V
C308	DD1650001	Ceramic	50pF	±10%	50V
C309	EA1070109	Electroly	100μF $^{+100}_{-10}$%		10V
C310	EA1070109	Electroly	100μF $^{+100}_{-10}$%		10V
C311	DF1610305	Film	0.01μF	±10%	50V
C312	DF1610205	Film	0.01μF	±10%	50V
C313	EV1050351	Electroly	1μF	±20%	35V
C314	EV1050351	Electroly	1μF	±20%	35V
C315	EA1070359	Electroly	100μF $^{+100}_{-10}$%		35V
C316	EA4760509	Electroly	47μF $^{+100}_{-10}$%		50V
		SEMICONDUCTORS			
H301	HT313271T	Transistor	2SC1327T		
H302	HT313271T	Transistor	2SC1327T		
H303	HT313271T	Transistor	2SC1327T		
H304	HT313271T	Transistor	2SC1327T		
		MISCELLANEOUS			
J301	YP1000094	Plug			
J302	YP1000094	Plug			
J303	YP1000094	Plug			
J304	YP1000094	Plug			
J305	YP1000094	Plug			
J306	YP1000094	Plug			
J307	YP1000094	Plug			
J308	YP1000094	Plug			
P400	YD2851002	P.C. Board	Tone Amp.		
	ZZ2853102	P.C. Board Ass'y			
		RESISTORS (All			
R401	RT0510214	**resistors are ±5%**	1KΩ		
R402	RT0510214	**and ¼W.)**	1KΩ		
R403	RT0510214		1KΩ		
R404	RT0510214		1KΩ		
R405	RT0527414		270KΩ		
R406	RT0527414		270KΩ		
R407	RT0527414		270KΩ		
R408	RT0527414		270KΩ		
R409	RT0582414		820KΩ		
R410	RT0582414		820KΩ		
R411	RT0582414		820KΩ		
R412	RT0582414		820KΩ		
R413	RT0556214		5.6KΩ		
R414	RT0556214		5.6KΩ		
R415	RT0556214		5.6KΩ		

REF. DESIG.	MARANTZ PART NO.	DESCRIPTION
R416	RT0556214	5.6KΩ
R417	RT0747114	470Ω
R418	RT0547114	470Ω
R419	RT0547114	470Ω
R420	RT0547114	470Ω
R421	RT0510414	100KΩ
R422	RT0510414	100KΩ
R423	RT0510414	100KΩ
R424	RT0510414	100KΩ
R425	RT0516314	16KΩ
R426	RT0516314	16KΩ
R427	RT0516314	16KΩ
R428	RT0516314	16KΩ
R429	RT0515414	150KΩ
R430	RT0515414	150KΩ
R431	RT0515414	150KΩ
R432	RT0515414	150KΩ
R433	RT0582114	820Ω
R434	RT0582114	820Ω
R435	RT0582114	820Ω
R436	RT0582114	820Ω
R437	RT0515314	15KΩ
R438	RT0515314	15KΩ
R439	RT0515314	15KΩ
R440	RT0515314	15KΩ
R441	RT0556314	56KΩ
R442	RT0556314	56KΩ
R443	RT0556314	56KΩ
R444	RT0556314	56KΩ
R445	RT0510214	1KΩ
		CAPACITORS
C401	DF1722405	Film 0.22μF ±20% 50V
C402	DF1722405	Film 0.22μF ±20% 50V
C403	DF1722405	Film 0.22μF ±20% 50V
C404	DF1722405	Film 0.22μF ±20% 50V
C405	EE4750251	Electroly 4.7μF ±20% 25V
C406	EE4750251	Electroly 4.7μF ±20% 25V
C407	EE4750251	Electroly 4.7μF ±20% 25V
C408	EE4750251	Electroly 4.7μF ±20% 25V
C409	EE2250351	Electroly 2.2μF ±20% 35V
C410	EE2250351	Electroly 2.2μF ±20% 35V
C411	EE2250351	Electroly 2.2μF ±20% 35V
C412	EE2250351	Electroly 2.2μF ±20% 35V
C413	DD1630001	Ceramic 30pF ±10% 50V
C414	DD1630001	Ceramic 30pF ±10% 50V
C415	DD1630001	Ceramic 30pF ±10% 50V
C416	DD1630001	Ceramic 30pF ±10% 50V
C417	EA1070109	Electroly 100μF $^{+100}_{-10}$% 10V
C418	EA1070109	Electroly 100μF $^{+100}_{-10}$% 10V
C419	EA1070109	Electroly 100μF $^{+100}_{-10}$% 10V
C420	EA1070109	Electroly 100μF $^{+100}_{-10}$% 10V
C421	EA1060259	Electroly 10μF $^{+100}_{-10}$% 25V
C422	EA1060259	Electroly 10μF $^{+100}_{-10}$% 25V
C423	EA1060259	Electroly 10μF $^{+100}_{-10}$% 25V

REF. DESIG.	MARANTZ PART NO.	DESCRIPTION
C424	EA1060259	Electroly 10μF $^{+100}_{-10}$% 25V
C425	EE1060351	Electroly 10μF ±20% 35V
C426	EE1060351	Electroly 10μF ±20% 35V
C427	EE1060351	Electroly 10μF ±20% 35V
C428	EE1060351	Electroly 10μF ±20% 35V
C429	EA4760509	Electroly 47μF $^{+100}_{-10}$% 50V
C430	EA4760509	Electroly 47μF $^{+100}_{-10}$% 50V
		SEMICONDUCTORS
H401	HT313271T	Transistor 2SC1327T
H402	HT313271T	Transistor 2SC1327T
H403	HT313271T	Transistor 2SC1327T
H404	HT313271T	Transistor 2SC1327T
H405	HT313271T	Transistor 2SC1327T
H406	HT313271T	Transistor 2SC1327T
H407	HT313271T	Transistor 2SC1327T
H408	HT313271T	Transistor 2SC1327T
H409	HT313271T	Transistor 2SC1327T
H410	HT313271T	Transistor 2SC1327T
H411	HT313271T	Transistor 2SC1327T
H412	HT313271T	Transistor 2SC1327T
		MISCELLANEOUS
J401	YP1000094	Plug
J402	YP1000094	Plug
J403	YP1000094	Plug
J404	YP1000094	Plug
J405	YP1000094	Plug
J406	YP1000094	Plug
J407	YP1000094	Plug
J408	YP1000094	Plug
J409	YP1000094	Plug
J410	YP1000094	Plug
J411	YP1000094	Plug
J412	YP1000094	Plug
J413	YP1000094	Plug
J414	YP1000094	Plug
J415	YP1000094	Plug
J416	YP1000094	Plug
J417	YP1000094	Plug
J418	YP1000094	Plug
J419	YP1000094	Plug
J420	YP1000094	Plug
J421	YP1000094	Plug
J422	YP1000094	Plug
J423	YP1000094	Plug
J424	YP1000094	Plug
J425	YP1000094	Plug
P500	YD2851001	P.C. Board Vari-Matrix
	ZZ2851001	P.C. Board Ass'y
		RESISTORS (All resistors are ±5% and ¼W.)
R501	RT0515414	150KΩ
R502	RT0515414	150KΩ
R503	RT0556314	56KΩ
R504	RT0556314	56KΩ
R505	RT0522414	220KΩ
R506	RT0522414	220KΩ
R507	RT0533414	330KΩ

REF. DESIG.	MARANTZ PART NO.	DESCRIPTION
R508	RT0533414	330KΩ
R509	RT0556214	5.6KΩ
R510	RT0556214	5.6KΩ
R511	RT0556214	5.6KΩ
R512	RT0556214	5.6KΩ
R513	RT0568214	6.8KΩ
R514	RT0568214	6.8KΩ
R515	RT0568214	6.8KΩ
R516	RT0568214	6.8KΩ
R517	RT0547314	47KΩ
R518	RT0547314	47KΩ
R519	RT0547314	47KΩ
R520	RT0547314	47KΩ
R521	RT0547414	470KΩ
R522	RT0547414	470KΩ
R523	RT0568314	68KΩ
R524	RT0568314	68KΩ
R525	RT0512514	1.2MΩ
R526	RT0512514	1.2MΩ
R527	RT0510214	1KΩ
R528	RT0510214	1KΩ
R529	RT0522314	22KΩ
R530	RT0522314	22KΩ
R531	RT0515314	15KΩ
R532	RT0515314	15KΩ
R533	RT0510414	100KΩ
R534	RT0510414	100KΩ
R535	RT0510214	1KΩ
R536	RT0510214	1KΩ
R537	RT0522114	220Ω
		MISCELLANEOUS
J501	YP1000094	Plug
J502	YP1000094	Plug
J503	YP1000094	Plug
J504	YP1000094	Plug
J505	YP1000094	Plug
J506	YP1000094	Plug
J507	YP1000094	Plug
J508	YP1000094	Plug
J509	YP1000094	Plug
J510	YP1000094	Plug
J511	YP1000094	Plug
J512	YP1000094	Plug
		CAPACITORS
C501	EE4740501	Electroly 0.47μF ±20% 50V
C502	EE4740501	Electroly 0.47μF ±20% 50V
C503	EE3350501	Electroly 3.3μF ±20% 50V
C504	EE3350501	Electroly 3.3μF ±20% 50V
C505	EE3350501	Electroly 3.3μF ±20% 50V
C506	EE3350501	Electroly 3.3μF ±20% 50V
C507	DF1747305	Film 0.047μF ±20% 50V
C508	DF1747305	Film 0.047μF ±20% 50V
C509	DF1747305	Film 0.047μF ±20% 50V
C510	DF1747305	Film 0.047μF ±20% 50V
C511	EE3350501	Electroly 3.3μF ±20% 50V
C512	EE3350501	Electroly 3.3μF ±20% 50V
C513	EE3350501	Electroly 3.3μF ±20% 50V
C514	EE3350501	Electroly 3.3μF ±20% 50V
C515	EA2260359	Electroly 22μF $^{+100}_{-10}$% 35V

REF. DESIG.	MARANTZ PART NO.	DESCRIPTION
C516	EA2260359	Electroly 22μF $^{+100}_{-10}$% 35V
C517	DD1650101	Ceramic 500pF ±10% 50V
C518	DD1650101	Ceramic 500pF ±10% 50V
C519	EA1070359	Electroly 100μF $^{+100}_{-10}$% 35V
		SEMICONDUCTORS
H501	HT313271S	Transistor 2SC1327S
H502	HT313271S	Transistor 2SC1327S
H503	HT313271S	Transistor 2SC1327S
H504	HT313271S	Transistor 2SC1327S
H505	HT106401L	Transistor 2SA640L
H506	HT106401L	Transistor 2SA640L
		MISCELLANEOUS
1113	281810104	Support X 2
1121	51100306S	B.H.M. Screw X 8
1129	54020401A	Flat Washer P X 2
1131	54040402N	Spring Washer X 2
P600	YD2851003	P.C. Board Power Amp. X 2
	ZZ2851003	P.C. Board Ass'y
		RESISTORS (All
R601	RT0510314	**resistors are ±5%** 10KΩ X 2
R602	RT0510314	**and ¼W, unless** 10KΩ X 2
R603	RT0547314	**otherwise indi-** 47KΩ X 2
R604	RT0547314	**cated.)** 47KΩ X 2
R605	RT0515514	1.5MΩ X 2
R606	RT0515514	1.5MΩ X 2
R607	RT0510114	100Ω X 2
R608	RT0510114	100Ω X 2
R609	RT0568214	6.8KΩ X 2
R610	RT0568214	6.8KΩ X 2
R611	RT0522314	22KΩ X 2
R612	RT0522314	22KΩ X 2
R613	RT0533214	3.3KΩ X 2
R614	RT0533214	3.3KΩ X 2
R615	RT0516314	16KΩ X 2
R616	RT0516314	16KΩ X 2
R619	RT0515414	150KΩ X 2
R620	RT0515414	150KΩ X 2
R617	RA0204004	Trimming 200KΩB X 2
R618	RA0204004	Trimming 200KΩB X 2
R621	RT0510114	100Ω X 2
R622	RT0510114	100Ω X 2
R623	RT0527214	2.7KΩ X 2
R624	RT0527214	2.7KΩ X 2
R625	RT0539214	3.9KΩ X 2
R626	RT0539214	3.9KΩ X 2
R627	RT0582214	8.2KΩ X 2
R628	RT0582214	8.2KΩ X 2
R629	RA0201003	Trimming 200ΩB X 2
R630	RA0201003	Trimming 200ΩB X 2
R631	GF0539114	390Ω X 2
R632	GF0539114	390Ω X 2
R633	GF0539114	390Ω X 2
R634	GF0539114	390Ω X 2

REF. DESIG.	MARANTZ PART NO.	DESCRIPTION
R635	RT0551314	51KΩ X 2
R636	RT0551314	51KΩ X 2
R637	RT0551314	51KΩ X 2
R638	RT0551314	51KΩ X 2
R639	GF0533114	330Ω X 2
R640	GF0533114	330Ω X 2
R641	GF0533114	330Ω X 2
R642	GF0533114	330Ω X 2
R643	GF0522014	22Ω X 2
R644	GF0522014	22Ω X 2
R645	GF0582114	820Ω X 2
R646	GF0582114	820Ω X 2
R647	RW1000503	0.5Ω ±10% 3W X 2
R648	RW1000503	0.5Ω ±10% 3W X 2
R649	RW1000503	0.5Ω ±10% 3W X 2
R650	RW1000503	0.5Ω ±10% 3W X 2
R651	GF0582114	820Ω X 2
R652	GF0582114	820Ω X 2
R653	GF0539014	39Ω X 2
R654	GF0539014	39Ω X 2
R655	RC1010012	10Ω ±10% ½W X 2
R656	RC1010012	10Ω ±10% ½W X 2
R657	RC1002212	2.2Ω ±10% ½W X 2
R658	RC1002212	2.2Ω ±10% ½W X 2
R659	RC1047012	47Ω ±10% ½W X 2
R660	RC1047012	47Ω ±10% ½W X 2
R661	RJ1010101	100Ω ±10% 1W X 2
R662	RJ1010101	100Ω ±10% 1W X 2
		CAPACITORS
C601	DD1530102	Ceramic 300pF ±5% 50V X 2
C602	DD1530102	Ceramic 300pF ±5% 50V X 2
C603	DF1722405	Film 0.22μF ±20%50V X 2
C604	DF1722405	Film 0.22μF ±20% 50V X 2
C605	EA4760509	Electroly 47μF $^{+100}_{-10}$% 50V X 2
C606	EA4760509	Electroly 47μF $^{+100}_{-10}$% 50V X 2
C607	DD1650001	Ceramic 50pF ±10% 50V X 2
C608	DD1650001	Ceramic 50pF ±10% 50V X 2
C609	EA1060359	Electroly 10μF $^{+100}_{-10}$% 35V X 2
C610	EA1060359	Electroly 10μF $^{+100}_{-1.2}$% 35V X 2
C611	DD1630001	Ceramic 30pF ±10% 50V X 2
C612	DD1630001	Ceramic 30pF ±10% 50V X 2
C613	EA1070109	Electroly 100μF $^{+100}_{-10}$%10V X 2
C614	EA1070109	Electroly 100μF $^{+100}_{-10}$%10V X 2
C615	EA4760509	Electroly 47μF $^{+100}_{-10}$% 50V X 2
C616	EA4760509	Electroly 47μF $^{+100}_{-10}$% 50V X 2
C617	EA2260509	Electroly 22μF $^{+100}_{-10}$% 50V X 2
C618	EA2260509	Electroly 22μF $^{+100}_{-10}$% 50V X 2
C619	DD1650001	Ceramic 50pF ±10% 50V X 2
C620	DD1650001	Ceramic 50pF ±10% 50V X 2
C621	DD1650001	Ceramic 50pF ±10% 50V X 2
C622	DD1650001	Ceramic 50pF ±10% 50V X 2

REF. DESIG.	MARANTZ PART NO.	DESCRIPTION
C623	EB2280354	Electroly 2200μF $^{+100}_{-10}$% 35VX2
C624	EB2280354	Electroly 2200μF $^{+100}_{-10}$% 35VX2
C625	DF1710405	Film 0.1μF ±20% 50V X 2
C626	DF1710405	Film 0.1μF ±20% 50V X 2
		SEMICONDUCTORS
H601	HT313272A	Transistor 2SC1327S or T X 2
H602	HT313272A	Transistor 2SC1327S or T X 2
H603	HT313182B	Transistor 2SC1318Q or R X 2
H604	HT313182B	Transistor 2SC1318Q or R X 2
H605	HT309451Q	Transistor 2SC945Q X 2
H606	HT309451Q	Transistor 2SC945Q X 2
H607	HT106411M	Transistor 2SA641L X 2
H608	HT106411M	Transistor 2SA641L X 2
H609	HT313842F	Transistor 2SC1384Q or R
H610	HT313842F	Transistor 2SC1384Q or R
H611	HT106842F	Transistor 2SA684Q or R
H612	HT106842F	Transistor 2SA684Q or R
H613	HV0000205	Varistor M8513A0 X 2
H614	HV0000205	Varistor M8513A0 X 2
H615	HD1000105	Diode IN60 X 2
H616	HD1000105	Diode IN60 X 2
H617	HD1000105	Diode IN60 X 2
H618	HD1000105	Diode IN60 X 2
		MISCELLANEOUS
L601	LL2391512	Choke Coil X 2
L602	LL2391512	Choke Coil X 2
J601	YP1000099	Plug X 2
J602	YP1000099	Plug X 2
J603	YP1000099	Plug X 2
J604	YP1000099	Plug X 2
J606	YP1000099	Plug X 2
J607	YP1000099	Plug X 2
J608	YP1000099	Plug X 2
J609	YP1000099	Plug X 2
J610	YP1000099	Plug X 2
J611	YP1000099	Plug X 2
J612	YP1000099	Plug X 2
J613	YP1000099	Plug X 2
J614	YP1000099	Plug X 2
J615	YP1000099	Plug X 2
J616	YP1000099	Plug X 2
J617	YP1000099	Plug X 2
J618	YP1000099	Plug X 2
J619	YP1000099	Plug X 2
J620	YP1000099	Plug X 2
J621	YP1000099	Plug X 2
J622	YP1000099	Plug X 2
J623	YP1000099	Plug X 2
J624	YP1000099	Plug X 2
J625	YP1000099	Plug X 2
1103	285126701	Heat Sink X 2
1107	282016007	Bracket X 4
1109	285116006	Bracket X 4
1111	282026702	Heat Sink X 4
1123	51570305B	P.H. Tapt Screw X 8

REF. DESIG.	MARANTZ PART NO.	DESCRIPTION
1125	51570306B	P.H. Tapt Screw X 16
1127	51100308S	B.H.M. Screw X 4
		SEMICONDUCTORS
H001	HT403152B	Transistor 2SD315 C or D
H002	HT403152B	Transistor 2SD315 C or D
H003	HT403152B	Transistor 2SD315 C or D
H004	HT403152B	Transistor 2SD315 C or D
H005	HT403152B	Transistor 2SD315 C or D
H006	HT403152B	Transistor 2SD315 C or D
H007	HT403152B	Transistor 2SD315 C or D
H008	HT403152B	Transistor 2SD315 C or D
H009	HV0000212	Varistor SV-3X
H010	HV0000212	Varistor SV-3X
H011	HV0000212	Varistor SV-3X
H012	HV0000212	Varistor SV-3V
P800	YD2853006	P.C. Board Power Supply
	ZZ2853006	P.C. Board Ass'y
		RESISTORS
R801	RA0502013	Trimming 4.7KΩB
R802	GF0556214	5.6KΩ ±5% ¼W
R803	RT0527314	27KΩ ±5% ¼W
R804	GF0539214	3.9KΩ ±5% ¼W
R805	RC1010112	100Ω ±10% ½W
R806	RT0512314	12KΩ ±5% ¼W
R807	RJ1047001	47Ω ±10% 1W
R808	GJ1039102	390Ω ±10% 2W
R809	RW1000503	0.5Ω ±10% 3W
		CAPACITORS
C801	EA3350509	Electroly 3.3μF $^{+100}_{-10}$% 50V
C802	EA1080109	Electroly 1000μF 10V
C803	EA2270359	Electroly 220μF 35V
C804	EA4770109	Electroly 470μF 10V
		SEMICONDUCTORS
H801	HT309452A	Transistor 2SC945 Q or R
H802	HT403151E	Transistor 2SD315E
H803	HD3002309	Diode WZ-07
H804	HD3002109	Diode BZ-140 14V 1W
H805	HD2000501	Diode W-06B
		MISCELLANEOUS
J801	YP1000094	Plug
J802	YP1000094	Plug
J803	YP1000094	Plug
J804	YP1000094	Plug
J805	YP1000094	Plug
J806	YP1000094	Plug
J807	YP1000094	Plug
J808	YP1000094	Plug
J809	YP1000094	Plug
J810	YP1000094	Plug
0403	285316050	Bracket K
0407	285312201	Sticker
0409	281816003	Bracket
0410	281816004	Bracket

REF. DESIG.	MARANTZ PART NO.	DESCRIPTION
0508	285326901	Protector
0628	257710602	Bearing
0629	141511801	Spacer
0631	51040306A	F.H.M. Screw X 2
0704	51100305A	B.H.M. Screw X 6
0706	51102605A	B.H.M. Screw X 6
0708	51570305B	P.H. Tapt Screw X 2
0714	51100406A	B.H.M. Screw X 4
0726	51570306B	P.H. Tapt Screw
0728	51042606S	F.H.M. Screw X 5
0734	51570306B	P.H. Tapt Screw X 2
0710	51570306B	P.H. Tapt Screw X 2
R001	RM0503050	Resistor Variable 50KΩB (Dimension)
R002	RG0204001	Resistor Variable 200KΩB (Volume)
S001	SR1204007	Rotary Switch (Selector)
R003	RT0518314	Resistor 18KΩ ±5% ¼W
R004	RT0518314	Resistor 18KΩ ±5% ¼W
C003	EA4760169	Capacitor Electroly 47μF 16V
S002	SR1105001	Rotary Switch (Mode)
S003	SR0802002	Rotary Switch (Remocon)
S004	SP0701001	Push Switch (Power)
M009	IM1104203	DC Meter Signal Strength
C004	EA1070109	Capacitor Electroly 100μF 10V
P700	YD2853004	P.C. Board Loudness Spk SW
	ZZ2853004	P.C. Board Ass'y
		RESISTORS (All resistors are ±5% and ¼W.)
R701	RT0568314	68KΩ
R702	RT0568314	68KΩ
R703	RT0568314	68KΩ
R704	RT0568314	68KΩ
R705	RT0518314	18KΩ
R706	RT0518314	18KΩ
R707	RT0518314	18KΩ
R708	RT0518314	18KΩ
		CAPACITORS
C701	DD1620101	Ceramic 200pF ±10%
C702	DD1620101	Ceramic 200pF ±10%
C703	DD1620101	Ceramic 200pF ±10%
C704	DD1620101	Ceramic 200pF ±10%
C705	DF1622305	Film 0.022μF ±10%
C706	DF1622305	Film 0.022μF ±10%
C707	DF1622305	Film 0.022μF ±10%
C708	DF1622305	Film 0.022μF ±10%
		MISCELLANEOUS
J701	YP1000094	Plug
J702	YP1000094	Plug
J703	YP1000094	Plug
J704	YP1000094	Plug
J705	YP1000094	Plug
S701	SP0403006	Push Switch

REF. DESIG.	MARANTZ PART BO.	DESCRIPTION
0429	281805101	Guide
0430	281910701	Sheet
0432	281826251	Pulley K
0731	51100305A	B.H.M. Screw X 2
P750	YD2853003	P.C. Board Tone
	ZZ2853003	P.C. Board Ass'y
		RESISTORS
		(All resistors are ±5% and ¼w, unless otherwise indicated.)
R751	RG0503001	Variable 50KΩ A X 4 Bass
R752	RG0503001	Variable 50KΩ A X 4 Treble
R755	RT0568214	6.8KΩ
R756	RT0568214	6.8KΩ
R757	RT0568214	6.8KΩ
R758	RT0568214	6.8KΩ
R759	RT0512214	1.2KΩ
R760	RT0512214	1.2KΩ
R761	RT0512214	1.2KΩ
R762	RT0512214	1.2KΩ
R763	RT0522414	220KΩ
R764	RT0522414	220KΩ
R765	RT0522414	220KΩ
R766	RT0522414	220KΩ
R767	RT0527214	2.7KΩ
R768	RT0527214	2.7KΩ
R769	RT0527214	2.7KΩ
R770	RT0527214	2.7KΩ
R771	RT0522214	2.2KΩ
R772	RT0522214	2.2KΩ
R773	RT0522214	2.2KΩ
R774	RT0522214	2.2KΩ
		CAPACITORS
C751	DF1740301	Film 0.04μF ±20% 50V
C752	DF1740301	Film 0.04μF ±20% 50V
C753	DF1740301	Film 0.04μF ±20% 50V
C754	DF1740301	Film 0.04μF ±20% 50V
C755	DF1722402	Film 0.22μF ±20% 50V
C756	DF1722402	Film 0.22μF ±20% 50V
C757	DF1722402	Film 0.22μF ±20% 50V
C758	DF1722402	Film 0.22μF ±20% 50V
C759	DF1647205	Film 0.0047μF ±10% 50V
C760	DF1647205	Film 0.0047μF ±10% 50V
C761	DF1647205	Film 0.0047μF ±10% 50V
C762	DF1647205	Film 0.0047μF ±10% 50V
C763	DF1633305	Film 0.033μF ±10% 50V
C764	DF1633305	Film 0.033μF ±10% 50V
C765	DF1633305	Film 0.033μF ±10% 50V
C766	DF1633305	Film 0.033μF ±10% 50V
		MISCELLANEOUS
J751	YP1000094	Plug
J752	YP1000094	Plug
J753	YP1000094	Plug
J754	YP1000094	Plug
J755	YP1000094	Plug
J756	YP1000094	Plug
J757	YP1000094	Plug
J758	YP1000094	Plug
J759	YP1000094	Plug

REF. DESIG.	MARANTZ PART NO.	DESCRIPTION
0413	281927401	Reflector
0414	281927101	Holder
0416	28182625	Pulley K
0718	51570305B	P.H. Tapt Screw
0730	51100305A	B.H.M. Screw
4436	51100305A	B.H.M. Screw
M003	IN1008007	Lamp
J017	YJ0800019	Socket
0503	285327402	Reflector
0505	285327102	Holder
4536	51570305B	P.H. Tapt Screw
4537	51100305A	B.H.M. Screw
J016	YJ0800019	Socket
M002	IN1008007	Lamp
0424	281827101	Holder
0716	51570305B	P.H. Tapt Screw X 5
M004	IN1008007	Lamp
M005	IN1008007	Lamp
M006	IN1008007	Lamp
M007	IN1008007	Lamp
M008	IN1008007	Lamp
J018	YJ0800019	Socket
J019	YJ0800019	Socket
J020	YJ0800019	Socket
J021	YJ0800019	Socket
J022	YJ0800019	Socket
J002	YJ0100065	Jack
J003	YJ0100065	Jack
P900	YD2853002	P.C. Board Balance
	ZZ2853002	P.C. Board Ass'y
		RESISTORS
R901	RT0533214	3.3KΩ ±5% ¼W
R902	RT0533214	3.3KΩ ±5% ¼W
R903	RT0533214	3.3KΩ ±5% ¼W
R904	RT0533214	3.3KΩ ±5% ¼W
R905	RX0203012	Variable 20KΩG
R906	RX0203012	Variable 20KΩM
R907	RS0203004	Variable 20KΩG X 2
		MISCELLANEOUS
J901	YP1000099	Plug
J902	YP1000099	Plug
J903	YP1000099	Plug
J904	YP1000099	Plug
J905	YP1000099	Plug
J906	YP1000099	Plug
J908	YP1000099	Plug
J909	YP1000099	Plug
J910	YP1000099	Plug
P950	YD2853005	P.C. Board Hi Filter
	ZZ2853005	P.C. Board Ass'y
		RESISTORS (All resistors are ±5% and ¼W, unless otherwise indicated.)
R951	RT0547214	4.7KΩ
R952	RT0547214	4.7KΩ
R953	RT0547214	4.7KΩ
R954	RT0547214	4.7KΩ
R955	RT0510514	1MΩ
R956	RT0510514	1MΩ
R957	RT0510514	1MΩ
R958	RT0510514	1MΩ

REF. DESIG.	PARANTZ PART NO.	DESCRIPTION
		CAPACITORS
C951	DF1668205	Film 0.0068μF ±10% 50V
C952	DF1668205	Film 0.0068μF ±10% 50V
C953	DF1668205	Film 0.0068μF ±10% 50V
C954	DF1668205	Film 0.0068μF ±10% 50V
		MISCELLANEOUS
S951	SP0403006	Push Switch
J951	YP1000094	Plug
J952	YP1000094	Plug
P980	YD2853001	P.C. Board Lamp
	ZZ2853001	P.C. Board Ass'y
		RESISTORS
R981	RC1022012	22Ω ±10% ½W
R982	RC1056012	56Ω ±10% ½W
		MISCELLANEOUS
M981	IN1006301	Lamp
M982	IN1006301	Lamp
M983	IN1006301	Lamp
J981	YP1000099	Plug
J982	YP1000099	Plug
J983	YP1000099	Plug
J984	YP1000099	Plug
J985	YP1000099	Plug
J986	YP1000099	Plug
J987	YP1000099	Plug
J988	YP1000099	Plug
0422	285327401	Reflector
0722	51570305B	P.H. Tapt Screw X 2
0724	51570305B	P.H. Tapt Screw X 2
0426	285327101	Holder
0720	51570306B	P.H. Tapt Screw X 2
C001	DK1710301	Capacitor Ceramic 0.01μF ±20% 50V
C002	DK1710301	Capacitor Ceramic 0.01μF ±20% 50V
J001	YJ0700006	Jack SQ Decoder
1213	285110450	Retainer K
1318	51100312S	B.H.M. Screw
0512	285310901	Shield
0513	281912002	Insulator
F	285316040	Rear Panel Ass'y
0803	285316001	Bracket
0809	281805501	Collar X 2
0811	285116007	Bracket
0903	51100308S	B.H.M. Screw X 10
0905	53110303E	Hexagon Nut X 10
0907	55060307F	T.R. Rivet X 4
0909	54050300R	T.L. Washer OR X 4
0913	51100306S	B.H.M. Screw X 4
0915	53110403E	Hexagon Nut
0916	62041760W	Lug
0917	54020401E	Flat Washer P
0918	54050400R	T.L. Washer OR
0920	51100312S	B.H.M. Screw X 2
0921	53110303E	Hexagon Nut

REF. DESIG.	MARANTZ PART NO.	DESCRIPTION
0922	51100306S	B.H.M. Screw
6736	51100308S	B.H.M. Screw X 6
6737	53110303E	Hexagon Nut X 6
6738	53110303E	Hexagon Nut X 2
J004	YP0208002	Terminal 8P
J005	YT0206003	Terminal
J006	YP0201006	Terminal
J008	YJ0400018	Jack AC Outlet
J009	YJ0400018	Jack AC Outlet
J010	YJ0800012	Socket Fuse Holder
J011	YT0304002	Terminal Spk
J012	YT0304002	Terminal Spk
J013	YT0304002	Terminal Spk
J014	YT0304002	Terminal Spk
J015	YL0301021	Terminal Ground
J023	YT0104004	Terminal FM/AM Ant.
0814	145525903	Bush
0818	145525903	Bush
0930	51100306S	B.H.M. Screw X 3
0931	54040302N	Spring Washer X 3
F001	FS1030003	Fuse 3A
G001	BF1040001	Printed Compo.
W001	YC0240010	AC Cord
R005	GT0522512	Resistor 2.2MΩ ±5% ½W
L002	LF1120024	Ant Coil AM
L003	LC1332002	Choke Coil 3±0.5μH
0820	257816052	Bracket K
0826	281927103	Holder
0924	51100310S	B.H.M. Screw X 2
0925	53110303E	Hexagon Nut X 2
0927	51100308S	B.H.M. Screw X 2
0928	53110303E	Hexagon Nut X 2
0929	54050300R	T.L. Washer OR X 2
C005	EC9080551	Capacitor Electroly 9000μF 55V
H013	HD2000510	Diode 5B-2
C006	DK1810351	Capacitor Ceramic $0.01\mu F^{+100}_{-0}\%$ 500V
C	285327340	Fly Wheel Ass'y
0603	257706302	Escutcheon X 2
0604	257727301	Fly Wheel
0605	285311201	Shaft
0610	53110603E	Hexagon Nut
0611	54040602N	Spring Washer
0612	54020601E	Flat Washer P
B	281810340	Pointer Ass'y
0531	281810301	Pointer
0532	281810302	Pointer
0533	281805301	Cover
M001	IN1008018	Lamp

REF. DESIG.	MARANTZ PART NO.	DESCRIPTION
E	285315940	Drum Ass'y
1004	281915901	Drum
1005	71101569M	Spring
1021	51650304D	Set Screw H.P. X 2
6036	138200503	Clamper X 8
D	120200640	String Ass'y
0528	120225801	Hook
0529	72080802A	String X 120
A	285306340	Front Panel Ass'y
0103	285306301	Escutcheon
0104	285340101	Frame
0105	285315801	Window
0106	281825905	Bush X 7
0107	273125901	Bush X 2
0108	285025901	Bush X 3
0109	285305301	Cover
C007	DK1840302	Capacitor Ceramic $0.04\mu F^{+80}_{-20}\%$
W002	YW2853001	Wire Material
W003	YX2853001	Wire Material
0128	275905701	Leg x 4
0313	51100410A	B.H.M. Screw x 4
0314	54020401A	Flat Washer P x 4
0315	54040402A	Spring Washer x 4
1203	285310550	Chasiss K
1218	281900501	Clamper
1221	285310102	Support X 2
1222	54040402N	Spring Washer X 2
1225	138200503	Clamper X 2
1227	273025901	Bush X 2
1303	51570306B	P.H. Tapt Screw X 8
1305	51570306B	P.H. Tapt Screw X 2
1307	51570306B	P.H. Tapt Screw X 2
1309	51570306B	P.H. Tapt Screw X 10
1311	51100306S	B.H.M. Screw X 6
1312	51100306S	B.H.M. Screw X 2
1313	51100306S	B.H. M. Screws X 4
1314	51100306S	B.H.M. Screw X 4
1315	51100306S	B.H.M. Screw X 2
1317	51100306S	B.H.M. Screw X 2
1326	54050300R	T.L. Washer OR X 10
1327	62031650W	Lug X 10
1330	51570306B	P.H. Tapt Screw X 10
1331	51570306B	P.H. Tapt Screw X 10
1320	53110401A	Hexagon Nut X 4
1321	54040402N	Spring Washer X 4
1322	54020401A	Flat Washer P X 4
1324	53110503A	Hexagon Nut X 4
L001	TS1960401	Power Transf.

REF. DESIG.	MARANTZ PART NO.	DESCRIPTION
0112	285325701	Lid
0113	257711803	Spacer X 4
G	285325740	Bottom Cover Ass'y
0115	285325750	Lid K
0118	285125703	Lid
0130	51216059E	Screw X 4
0131	250712001	Insulator
0119	282111801	Spacer
0122	281815401	Knob X 7
0124	285015401	Knob X 3
0126	281815403	Knob X 7
0202	285326501	Indicator
0211	257886101	Label
0212	257886102	Label
0213	257886103	Label
0214	250626506	Indicator
0217	281826506	Indicator
0218	284626501	Indicator
0224	951020102	Label
0303	51122608E	T.H.M. Screw X 4
0305	51100406S	B.H.M. Screw X 9
0309	51100406S	B.H.M. Screw X 4
0310	54020401S	Flat Washer P X 4
0510	285326902	Protector
0515	285330201	Dial
0522	285312001	Insulator
0523	281912002	Insulator
0530	56382540G	Eyelet
0535	286726901	Protector
0518	285310701	Sheet
0606	285011202	Shaft
0607	54040402N	Spring Washer
0616	285310650	Bearing K
0620	51640410D	Set Screw C.P.
0621	54040402N	Spring Washer
0622	53110403E	Hexagon Nut
0624	51100306A	B.H.M. Screw X 2
0625	54050300R	T.L. Washer OR X 2
0712	51570306B	P.H. Tapt Screw X 2
0733	51570306B	P.H. Tapt Screw X 2
0911	51100306S	B.H.M. Screw X 2
1402	285380101	Packing Case
1403	285380111	Packing Case
1408	285380301	Partitioner
1409	285380302	Partitioner
1412	901483838	Polyethylen Bag
1414	901302501	Polyethylen Bag X 2
1417	102980401	Sleeve
1419	273182101	Silicagel X 2
1420	281905601	Buffe
1422	952281501	Serial NO Card X 4
1431	ZA0200007	Ext Antenna
1502	285385101	Instructions
1509	285385601	Schematic Diagram
1517	281885104	Instructions
1518	281885108	Instructions
1523	257785450	Guarantee Card K

TECHNICAL SPECIFICATIONS

FM SECTION

Tuning Frequency Range	88 – 108 MHz
IHFM Usable Sensitivity	3.0 μV
IHF Selectivity	50 dB
Capture Ratio	2.5 dB
Image Rejection Ratio at 106 MHz	50 dB
Signal to Noise Ratio (Mono)	65 dB
Signal to Noise Ratio (Stereo)	55 dB
Total Harmonic Distortion (Mono)	0.2%
Total Harmonic Distortion (Stereo)	0.5%
Frequency Response (ref. 75μ sec. de-emphasis)	50 Hz – 15 KHz ± 1 dB
Stereo Separation at 1 KHz	40 dB
Quadradial Output (400 Hz 75 KHz dev.)	300 mV

AM SECTION

Tuning Frequency Range	540 – 1605 KHz
Usable Sensitivity	20 μV
Selectivity	20 dB
Image Rejection Ratio at 1400 KHz	40 dB
Signal to Noise Ratio	43 dB
Frequency Response (–3 dB)	50 Hz – 4 KHz
Total Harmonic Distortion	1%

AUDIO SECTION

Input Impedance – Low level input	Phono 47K ohm
– High level input	100K ohm
Input Sensitivity – Phono	2.0 mV for 15W output
– High level	150 mV for 15W output
Frequency Response	±2.0dB, 30Hz to 20KHz at 1W output
Intermodulation Distortion	Less than 1.0% at rated power output from 40Hz to 16KHz with all channels driven (S.M.P.T.E.)
Total Harmonic Distortion	Less than 1.0% at rated power output 40Hz to 16KHz with all channel driven
Damping Factor	Greater than 45 into 8 ohms load
Total Noise – From magnetic phono input to power amp output	Less than 3μV equivalent input at rated output into 8 ohms load
Volume Tracking	Within 3dB
Rated Continuous (RMS) Output per channel, all channels operating simultaneously	15W at 4 and 8 ohms 7.5W at 16 ohms
Comparable Total Music Power	90W at 8 ohms

GENERAL

Power Requirements	120V AC 50 to 60 Hz
Power Consumption – at rated power output, all channels	230 watts
– idling (no signal)	20 watts
Dimensions – Panel Width	17-21/64 Inches
– Panel Height	5-25/64 Inches
– Depth	14-3/8 Inches
Weight – Unit alone	26.5 lbs
– Packed for Shipment	37.5 lbs

* These specifications and exterior designs may be changed for improvement without advance notice.